NAVY MEDICINE

July-August 1995

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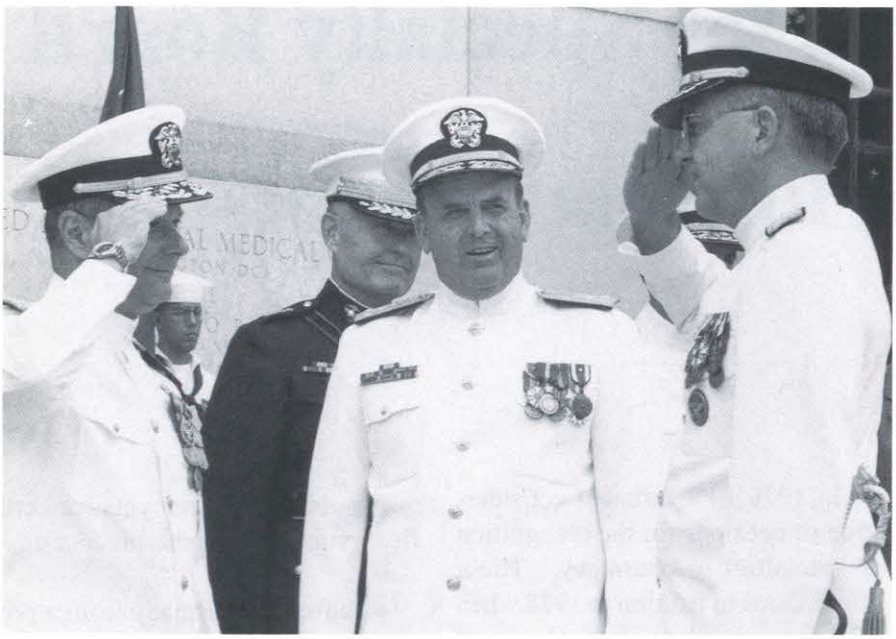
COVER: On 9 Sept 1994, shuttle *Discovery* headed for orbit carrying CDR Jerry Linenger, MC, the Navy's third physician-astronaut. Interview on page 8. NASA photo.



The Watch Changes

New Navy Surgeon General VADM Koenig (right) salutes ADM Boorda as VADM Hagen and GEN Mundy look on during change of command ceremony.

VADM Harold M. Koenig, MC, became the 32nd Surgeon General of the Navy and Chief, BUMED during a change of command ceremony on 29 June 1995 at NNMC Bethesda, MD. VADM Koenig takes over from VADM Donald F. Hagen, MC, who retires at the end of July after more than 30 years of service.

Guest speaker ADM Jeremy M. Boorda, Chief of Naval Operations, said he believed that not only Dr. Koenig, but the whole Koenig family was the right family for the job. He also stated that Navy missions are more successful when the sailors know that their loved ones are taken care of and that family members support what they [servicemembers] are doing. "The Koenigs are that type of family," said Boorda.

Prior to the ceremony, VADM Koenig had been serving as Deputy Surgeon General, Deputy Chief, BUMED, and Chief of the Medical Corps.

A California native, VADM Koenig began his Navy career in 1967. He trained in pediatrics and pediatric hematology-oncology at Naval Hospital San Diego, CA, from 1969 to 1973.

Immediately following the changing of the guard, a retirement ceremony was held in front of the Bethesda Tower. GEN Carl E. Mundy, Jr., Commandant of the Marine Corps, said he was thrilled to be in Bethesda and stated that he was, "Here to honor the man, VADM Donald Hagen."

ADM Boorda went on to say that "Don Hagen is what this business is all about," and then cast aside his prepared speech and spoke off the cuff. "The people of Navy medicine really care," continued CNO, as he discussed Dr. Hagen's career. "Don Hagen truly cared and led by example. He showed them [Navy medicine] how to be wonderful."

During his speech, VADM Hagen praised all the men and women of Navy medicine pointing out that the high level of medical readiness the Navy has achieved over the last several years had not come easily. "It is the result of hard work and commitment of many people . . . Navy medicine."

—Story by JOSN Maria-Christina Mercado, NNMC Public Affairs, Bethesda, MD. Photo by JO2 Roy DeCoster.

Opportunities for Specialty Board Certification for Pharmacists

LT Bob Grasso, MSC, USN

Board certification for pharmacists is a process by which pharmacists may demonstrate that they have attained a higher degree of training, experience, and knowledge than that which is required for licensure. Four areas of specialty certification have been approved. Examinations are available for three areas: pharmacotherapy, nutrition, and nuclear pharmacy. The fourth area, psychopharmacy has been approved and examination development is in progress.

In 1971 the American Pharmaceutical Association (APhA) Board of Trustees organized a task force on specialties in pharmacy. Their purpose was to conduct an analysis of pharmacy practice to determine if it warranted specialization. They recommended the formation of a board to certify pharmacy specialists. The Board of Pharmaceutical Specialties (BPS) was created on 5 Jan 1976. This board is composed of six pharmacists, two other health care professionals, and a member of the general public.

In 1976 BPS initiated consideration of petitions for the recognition of specialties in pharmacy. These efforts came to fruition in 1978 when BPS recognized nuclear pharmacy as a specialty practice area. The first Nuclear Pharmacy Specialty Examination was administered in 1982. In 1988 BPS recognized pharmacotherapy and nutrition support as two additional areas of specialty practice.

The first certification examination in pharmacotherapy was administered on 17 Aug 1991 and the first nutrition support pharmacy practice exam was administered on 17 Jan 1992. A fourth area of specialty practice, psychopharmacy, was recognized 27 Sept 1992 and examination development is in progress.

Board Certification in Nuclear Pharmacy

In 1978 the BPS approved an American Pharmaceutical Association petition for the recognition of nuclear pharmacy as a specialty practice area.

Eligibility requirements for certification in nuclear pharmacy are:

- Degree in pharmacy from a program accredited by the American Council on Pharmaceutical Education (ACPE)
- A current, valid license to practice pharmacy
- 4,000 hours of experience in nuclear pharmacy
- Achieving a passing score on the nuclear pharmacy examination

The examination consists of 200 multiple-choice items. The skills and knowledge required to pass the examination are taken from seven areas of the *Nuclear Pharmacy Practice Standards:*

- Procurement (14 items)
- Compounding (36 items)
- Routine Quality Control (31 items)
- Dispensing (35 items)
- Distribution (18 items)
- Basic Radiation Protection Procedures (33 items)

•Consultation and Education (33 items)

Pharmacists who successfully pass the certification examination may use the initials BCNP after their name.

Board Certification in Pharmacotherapy

The requirements to sit for board certification in pharmacotherapy are:

•Graduation from a pharmacy program accredited by the ACPE

•Current valid license to practice pharmacy

•Successful completion of one or more of the following:

a. Pharmacy residency program with substantial component of patient care activities in pharmacotherapy

b. Fellowship program

c. Not less than 5 years practice experience with a substantial component of patient care activities in pharmacotherapy

d. Passing score on the Pharmacotherapy Specialty Certification Examination

The examination consists of 200 multiple-choice questions administered during two 2 1/2-hour sessions.

Content of the Examination. The examination material is divided into three domains. Each domain is designed to test the skills and knowledge required to perform tasks in a major area of responsibility.

Domain 1: The pharmacist shall demonstrate the knowledge and skill required to collect and interpret data to design, recommend, implement, monitor, and modify patient-specific pharmacotherapy in collaboration with other health care professionals to optimize drug therapy (180 items).

Domain 2: Interpret, generate, and disseminate knowledge in pharmacotherapy (105 items).

Domain 3: Design, recommend, implement, monitor, and modify system-specific policies and procedures in collaboration with other professionals/administrators to optimize health care (15 items).

Areas of expertise which deal with patient care problems (Domain 1) comprise 60 percent of the examination. In order of priority these areas are: cardiovascular, gastrointestinal, respiratory, multisystem diseases, neurological, and renal. The remaining 40 percent of the exam will consist of items requiring expertise in (in priority order): fluid and electrolyte/metabolic, endocrine/exocrine, immunologic, genitourinary, hematologic, bone/joint, psychiatric, dermatologic, EENT, obstetrics/gynecology, and perinatology.

Examination areas which deal with infectious disease, oncology, and age-specific problems cross all organ systems and patient care problems. Individuals who successfully complete this examination and are granted the status of board-certified pharmacotherapy specialist may use the initials BCPS after their names.

Table 1

Board Certification of Pharmacists: Passing Exam/Taking Exam

Certification	1991	1992	1993	1994	Passing %
Nuclear+	35/49	51/55	60/65	58/65	87%
Pharmacotherapy	139/188++	124/182	222/289	207/268	75%
Nutrition		150/171++	86/114	68/88	82%

+The first nuclear examination was administered in 1982 but was not administered in 1978, 1989, or 1990. Passing % reflects only 1991 through 1994.
++First year for exam

Board Certification in Nutrition Support Pharmacy Practice

The American Society of Parenteral and Enteral Nutrition (ASPEN) and the American Society of Hospital Pharmacists (ASHP) requested recognition of nutrition support pharmacy practice specialty on 23 Nov 1987. This petition was approved by BPS on 14 Oct 1988.

Table 2

Exam	Dates	Location
Nutrition Support	13 Jan 1996	Los Angeles, Washington, DC
Nuclear	9 March 1996	Nashville, TN
Pharmacotherapy	7 Dec 1996	Newark, NJ; Chicago; New Orleans; Los Angeles

The examination for board certification in nutrition support pharmacy practice consists of a 200-item multiple-choice format. The minimum requirements for specialty certification are:

- Candidates must have earned an entry-level degree from a pharmacy program accredited by the ACPE.
- Candidates must have completed a specialized residency in nutrition support or a nutrition support fellowship and have 1 year of practice experience. Candidates without a residency or fellowship may sit for examination if they have a minimum of 3 years of practice experience with substantial experience in nutrition support.
- Candidates must possess a valid license to practice pharmacy.
- Candidates must successfully pass the Nutrition Support Practice Specialty Certification Examination.

The examination samples knowledge and skills required to perform tasks in three domains of nutrition support pharmacy practice.

Domain 1: Provision of individualized nutrition support care to patients

Subdomain A. Assessment (30 items)

Subdomain B. Development of the Therapeutic Plan (30 items)

Subdomain C. Implementation (20 items)

Subdomain D. Monitoring and Management (60 items)

Domain 2: Management of nutrition support services (40 items)

Domain 3: Advancement of nutrition support pharmacy practice (20 items)

Board certification for pharmacists is becoming an increasingly important achievement for pharmacists. The current number of board-certified nuclear pharmacists (BCNP) is 288. The current number of board-certified nutrition support pharmacists (BCNSP) is 304. The current number of board-certified pharmacotherapy specialists (BCPS) is 692. In total 1,284 pharmacists are board certified. Table 1 summarizes the number of pharmacists sitting for board certification and the number of pharmacists successfully achieving board certification.

The fee for the examination for board certification in nutrition and board certification in nuclear pharmacy is $500. The pharmacotherapy examination fee will be $550 beginning with the 1995 examination. Certified pharmacists in each specialty practice area must pay an annual fee of $25. Recertification is required every 7 years. Upcoming exam dates and locations are listed in Table 2.

Many Navy pharmacy officers are preparing for board certification examinations in one or more of the specialty practice areas in order to establish the additional credentials required to lead Navy pharmacy into the 21st century.

Candidate guides for each certification examination are available from the Board of Pharmaceutical Specialties, American Pharmaceutical Association, 2215 Constitution Avenue, NW, Washington, DC 20037. Telephone: 202-429-7591. ❑

LT Grasso is a member of the Department of Pharmacy staff at Naval Medical Center Portsmouth, Portsmouth, VA, and was the recipient of the 1994 Navy Outstanding Junior Pharmacist award.

Women Volunteers Engage in Impact Acceleration Research

CDR R.W. Rendin, MSC, USN
CDR L.W. Schoenberg, MSC, USN

As designers and manufacturers of modern military aircraft are able to build faster and more maneuverable platforms, greater consideration than ever before must be given to ensuring that aircrew can physically tolerate increased forces and successfully perform their mission.

Aviators experience both sustained high G and short duration indirect impact high G forces in tactical aircraft. As a result, it is not surprising that survey results indicate a high incidence of neck pain and injury.(*1,2*) In addition, mission effectiveness can be compromised when aviators restrict the movement of their head and neck or if they temporarily remove themselves from flight status. Since most aircrew consider a certain amount of neck pain as acceptable, significant official underreporting of the problem is suspected.(*3*)

Although validated epidemiologic data are lacking, the consistency and pattern of the available data support the significance of this problem. In extreme cases, severe neck injury, such as fractures and herniated disks can occur during tactical maneuvers or during emergency ejection.(*4*) The significance of this problem is increased as weight is added to the aviator's helmet in the form of mission-enhancing equipment such as targeting and night vision devices. The added weight of these systems changes the head-helmet center of gravity, thus exacerbating forces during high G maneuvers.

To predict the human head/neck tolerance to these forces, the Naval Biodynamics Laboratory (NBDL) in New Orleans, LA, has conducted a series of experiments using human research volunteers. These experiments have been conducted in various vector directions (Figure 1), helmeted and unhelmeted, and with added head mass.(*5*) So far, *this* data has been recorded from men volunteers only. A study is currently under way

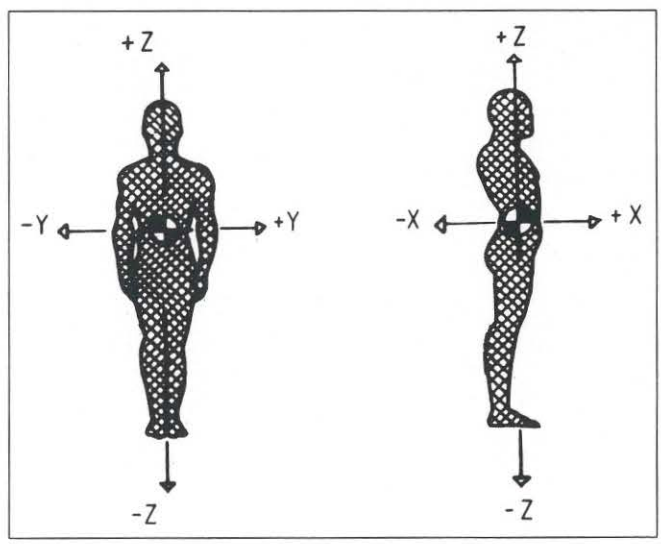


Figure 1. Acceleration direction reference

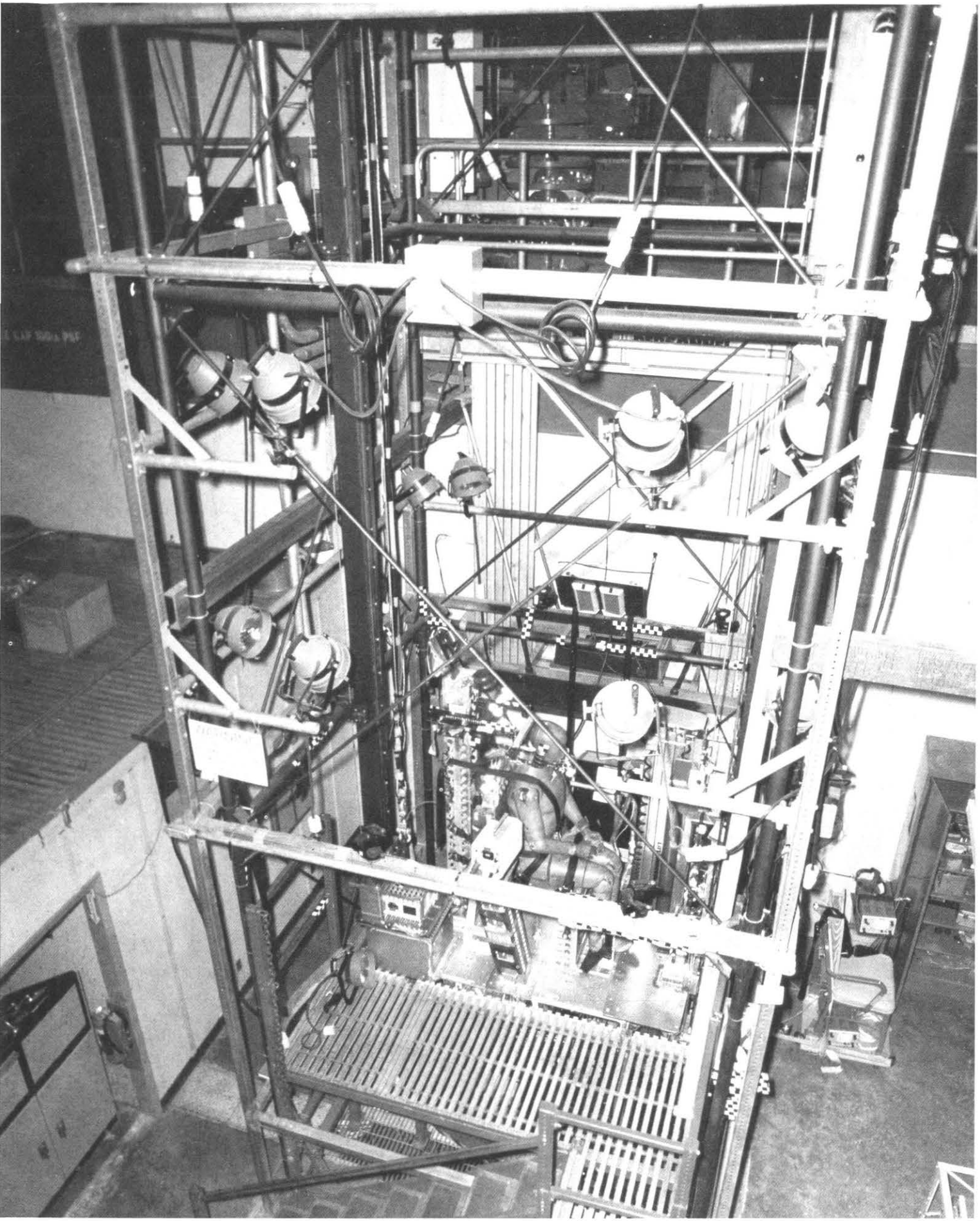


Figure 2. NBDL vertical accelerator

Figure 3. Research volunteer wearing securely fixed photographic targets and accelerometers.

designed exclusively to gather unhelmeted women response data and compare this with corresponding men response.

This research is conducted using a 36-foot vertical accelerator (Figure 2) that propels a seated volunteer upward in the +Gz direction. The force, considered indirect impact, is transmitted to the seat by a nitrogen-powered piston. The test series begins at 3 G with the force level increasing 1 G at a time. Over the period of several weeks, volunteers may experience forces of up to 12 G.

Extremely precise measurements of head and neck movement are required. To achieve this, volunteers wear individually tailored maxillary dental and first thoracic vertebrae (T-1) fixtures (Figure 3) to securely fix accelerometer-camera target packages. High-speed cameras record head and neck movement and track targets from three directions at 500 frames per second. Three dimensional head and neck trajectory information is produced from the digitized two-dimensional locations of the targets on the film. During test runs, volunteers are carefully monitored by medical personnel.

The research volunteers are active duty enlisted personnel who are recruited directly from Apprenticeship Training School at a recruit training command. After a rigorous medical (including magnetic resonance imaging of the spine), dental, and psychological screening at NBDL, candidates are selected for participation in the Impact Acceleration Program.

Prior to the daily human testing, one or more manikin tests are performed. In addition to their system checkout function, these tests are of great interest to the manufacturers of crash test manikins for the automobile industry. The neck in the current Hybrid III manikin responds very differently than a human neck under the same force conditions (Figure 4). Data from NBDL research is being used to develop a manikin head/neck with greater biofidelity.

The results of this study will be used primarily to compare women and men head/neck response to indirect impact acceleration. The data will also be used to construct and validate a computerized finite element model of the human cervical spine, currently under development with Tulane University. This model will predict injury potential during actual aircraft ejection and other high force scenarios.

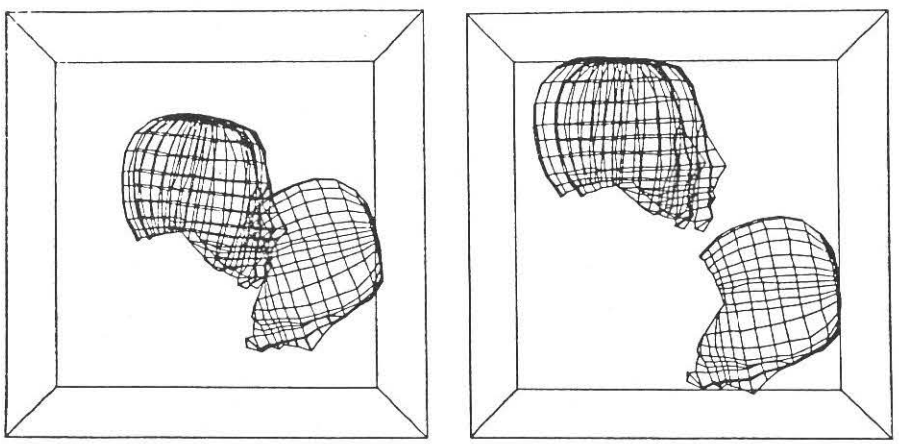


Figure 4. Comparison of head trajectories for -15Gx horizontal acceleration

References

1. Vanderbeek RD. Period prevalence of acute neck injury in U.S. Air Force pilots exposed to high G forces. *Aviat Space Environ Med.* December 1988;59(12):1176-1180.

2. Knudsen R, et al. A comparative study of G-induced neck injury in pilots of the F/A 18, A-7, and A-4. *Aviat Space Environ Med.* 1988; 59(8):758-760.

3. Yacovone DW, Bason R. Cervical injuries during high G maneuvers: a review of Naval Safety Center data, 1980-1990. *Aviat Space Environ Med.* July 1992;63(7):602-605.

4. Naval Research Advisory Committee (NRAC) Panel Report. *Aviator Physical Stress.* July 1990.

5. Grunsten RC, Gilbert NS, Mawn SV. The mechanical effects of impact acceleration on the unconstrained human head and neck complex. *Contemp Orthop.* February 1989;18(2):189-202. ❑

CDR Rendin is Commanding Officer at Naval Biodynamics Laboratory, New Orleans, LA. CDR Schoenberg is Executive Officer at the same facility.

STS-64 crew (left to right): Mission Specialist CDR Jerry M. Linenger, MC, USN; Mission Specialist COL Mark C. Lee, USAF; Pilot COL L. Blaine Hammond, Jr., USAF; Mission Specialist LCOL Susan J. Helms, USAF; Mission Specialist COL Carl J. Meade, USAF; and Commander CAPT Richard N. Richards, USN

NASA photos

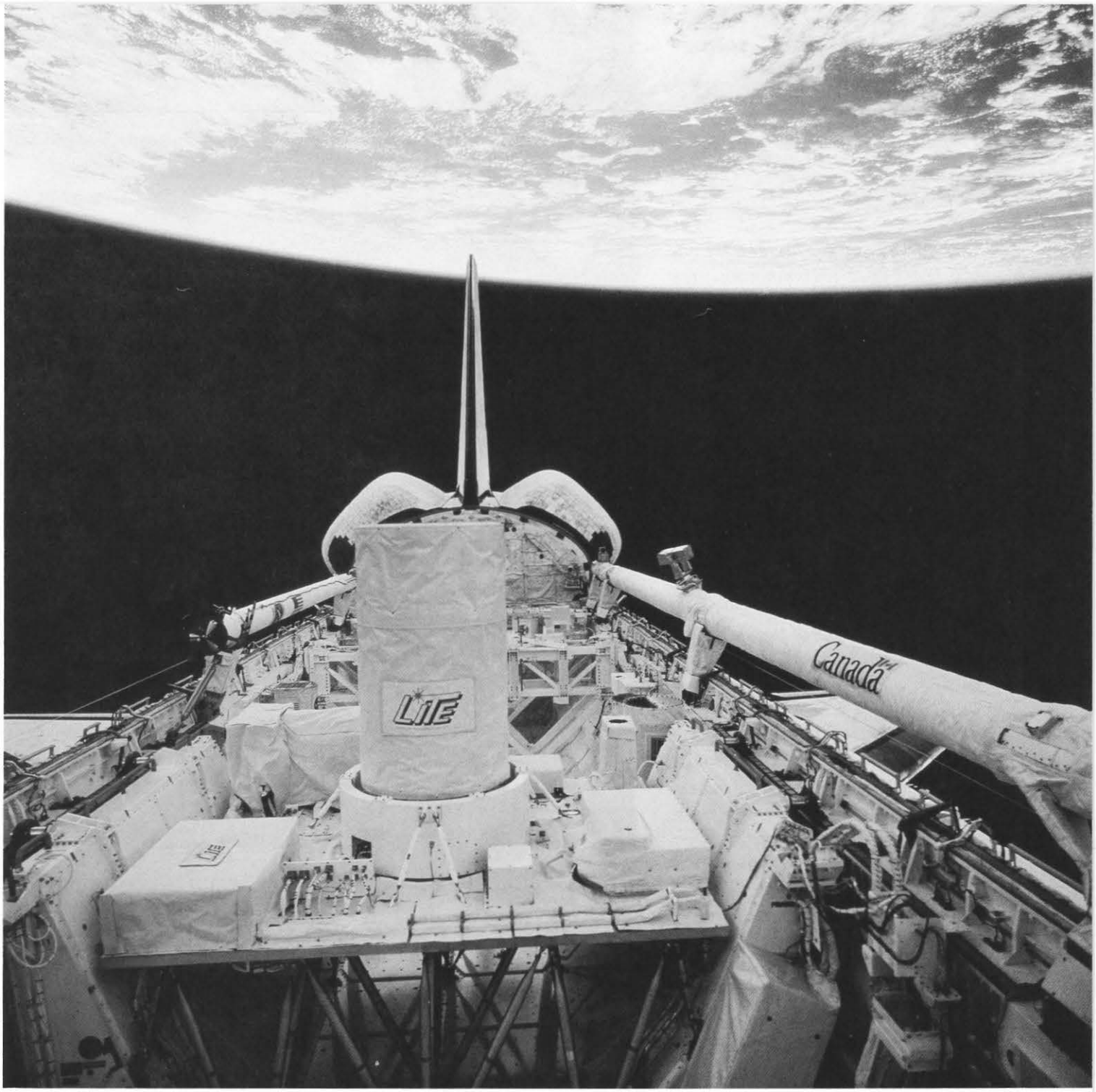
Navy Medicine's Shuttle Doc

The atmosphere beside the causeway this hot Florida afternoon is festive. Cars, vans, and campers, parked bumper-to-bumper on the grass shoulder, have disgorged passengers, coolers, and binoculars. Now ensconced in lawn chairs or seated on the ground, everyone focuses on a launch pad some 6 miles away.

Menacing thunderstorms in the vicinity cause repeated breaks in the countdown, but a tantalizing hole in the clouds instantly changes things. The countdown resumes. Over a nearby speaker a voice proclaims "...4, 3... We have main engine start ...2, 1, 0... SRB ignition."

Space Shuttle Discovery *hovers but for an instant, then, perched atop a white-orange pillar of flame, hurtles skyward, not hesitatingly like the gargantuan* Apollo *vehicles of moon landing days, but like a skyrocket on the Fourth of July. For a full 30 seconds, as the trail of the whitest smoke begins to arc downrange, there is total silence. Then a throaty roar washes over the crowd. Cheering enthusiasts roar back their approval. STS-64 is on its way and with it CDR Jerry Linenger, Navy medicine's astronaut.*

On 9 Sept 1994 the Michigan native became the third Navy physician to orbit the earth. Since manned space flight began in the early 1960's,



Snugly housed in *Discovery*'s cargo bay, LITE, the LIDAR In-Space Technology Experiment, will aim its laser beam at the earth's atmosphere. Note the robot arm on the right, Canada's contribution to the space shuttle.

two other Navy flight surgeons have been in space—Joseph Kerwin (Navy Medicine, December *1979), and Sonny Carter who, as a shuttle astronaut, made one flight before dying tragically in an airplane crash.*

Sixteen years ago Navy Medicine *interviewed Kerwin, a crewmember on* Skylab. *Built from leftover components of the* Apollo *moon boosters, the orbiting laboratory offered space scientists an opportunity to live and work in an environment of prolonged weightlessness.*

At the time, NASA was undergoing a transition to the next generation of spacecraft, the reusable shuttle, but the maiden flight of Columbia, *the*

Jerry Linenger carries out experiments while floating in the shuttle's mid-deck.

first shuttle, was still several years away.

Now many shuttle flights later, the U.S. space program is entering a new era of international cooperation. With one successful Shuttle-MIR docking mission under its belt, NASA will be conducting several more long duration missions with the Russians as a prelude to the construction of an international space station.

Having completed his first shuttle mission, Jerry Linenger has just begun training at Russia's Cosmonaut Training Center in Star City, Russia, to prepare for the third Shuttle-MIR docking mission in August 1996. He will remain aboard the MIR *for 4 to 5 months conducting space microgravity and life science research.*

Before he left for Russia, Navy Medicine *talked with CDR Linenger at Johnson Space Center about his career and his recent shuttle mission.*

Since graduating from the Naval Academy fourth in his class of 950, Linenger has had a hard time sitting still. After becoming a physician, he earned master's degrees in public health and systems management, and a Ph.D. in epidemiology, all the while serving as a flight surgeon in several operational assignments. His last job before joining the astronaut corps in 1992 was as principal research investigator at the Naval Health Research Center in San Diego, CA.

Claiming to be "a student of applied curiosity," Linenger was a natural for the 11-day shuttle mission. STS (Space Transport System)-64 was packed with as much scientific curiosity and acronyms as any researcher could hope for—LIDAR, SPARTAN, ROMPS, SAFER, SPIFEX, SSCE, SAREX, MAST, BRIC.

Discovery *carried into space a unique laser ranging device —LIDAR—designed to study the earth's atmosphere from the top down. This instrument would help to measure atmospheric particles, cloud top heights, and atmospheric temperature and density. The orbiter was to test a robotic system for processing semiconductor materials in a space environment.*

Also housed in the cargo bay was the SPARTAN 201 satellite containing instruments to study the physics of the sun's solar wind by observing the sun's corona. During the mission the shuttle astronauts were to release the satellite using the shuttle's robot arm. After remaining in orbit a few days gathering data, the crew would recover SPARTAN and return it to earth.

One of the most exciting of the experiments was the SAFER (Simplified Aid for Extra-Vehicular Activity Rescue) device. Unlike the Manned Maneuvering Units used in 1984, SAFER, an 83-pound battery-powered jet pack, provides untethered astronauts a compact propulsion system they can use to save themselves should they drift away from the shuttle or a space station.

And then there were a series of medical experiments designed to

counter problems associated with long-duration space flight. With the space station and future exploration of the planets on the agenda, Dr. Linenger found this aspect of Discovery*'s mission particularly relevant.*

I was intrigued by an article I read about you in which you said you got interested in the space business while on a camping trip in Canada.

I was on the eastern shore of Lake Huron in 1969 and all the moon stuff was going on. One of us had a little portable generator and a TV. It seemed that all the people in the woods came and were watching some of the first shots of the men walking on the moon. Later that night, I lay under the stars and thought, "Man, I'd love to do that some day!"

Well, years later after a very active Navy career, you got your wish and, even though you're still a Navy flight surgeon, you're on loan to NASA. How does that work?

In my case, I'm here on a 5-year set of orders on loan to NASA. The Navy pays NASA who pays me. I'm still an active duty naval officer, get fitreps written by people here that go back to the Navy, and I'm subject to the Navy selection boards.

What happens once you get here?

It's pretty well organized. You're an astronaut candidate the first year. If you successfully complete the course work and the simulators, and a lot of the basic space flight training work, then at the end of the year you are declared a NASA astronaut and you're eligible for space flight.

Once you are assigned a mission, do you stay together as a crew?

Yes. You train as a team. There is a set number of simulators you have to go through and requirements that are baseline. Then depending on your payloads, you have a lot of different training requirements. In our case, we were going to launch the SPARTAN satellite so we needed special training; we had to know the satellite's systems, we had to know how to use the robot arm to launch the thing, we had to know the fail modes, and how to rendezvous the orbiter to go pick up the satellite. So all those things are put into your training as you approach flight. It takes about a year to get the crew ready. When you go to launch you know your crewmates inside and out. You know how they function. You've been in simulators all night with them and it's a good team at that point.

What kind of simulators did you train with? Do you still go in the water tank and fly the KC-135 to simulate zero G?

Yes. But it's probably not accurate to describe us as going in the tank and swimming around. The spacesuits weigh about 250 pounds once you get all the support equipment on it. The one we use in the tank weighs about 100 pounds so they put you on a platform, lift you with a crane, and put you in the water. And there you rehearse the EVA (Extra-Vehicular Activity) task—the spacewalk from beginning to end. You spend a lot of time in the tank making sure you can get the job done in the allotted time. It's almost like being in a play and you just keep practicing until you have it all down pat.

As an example, on my flight I had a role in performing the first untethered spacewalk in 10 years. There would be no lines attached to these guys. I was the inside guy. During all the training, I would be up in the control room looking at TV monitors and talking them through what they were doing. "Next step, Carl, we need you to go back to the robot arm and start working the manipulator system and I want Mark to do something else at this point." I was responsible for their safety and keeping track of consumables, propellent, looking out the back window, and making sure they weren't going to bump into the radiator. And in training we spent a lot of time just going through the choreography of us working as a team. It's a lot like getting a team ready for the Super Bowl.

The other aspect of training for weightlessness is the "Vomit Comet," which you have probably heard about. It's a big KC-135 with big foam pads inside so you can zoom from one end to the other. The plane flies a series of parabolas. For about 20 seconds going over the top you get the zero G feeling, the floating sensation of what it's like to be in space. The zero G and the 2 G combined is what gives it its nickname, the "Vomit Comet." You do about 40 parabolas during the same flight to get a good feel for it. The plane just goes up and down and up and down. They have an air space over the Gulf of Mexico they clear out and controllers keep other aircraft away.

The pads inside the plane must get a bit messy after one of these flights?

We're well prepared. An interesting side note on this is the new movie *Apollo 13*. Tom Hanks and the gang did the weightless scenes inside the Vomit Comet. One day, I was about to do a run in the water tank and looked over and saw a group of people I thought were high-school teachers. So I walked over to say hello and ask where they were from. It's really a privilege to be an astronaut and be able to shake someone's hand. You

shake a 10-year-old kid's hand and that kid is thrilled for at least the next week. So I began talking with this group of what I thought were teachers. And one of them said, "You're Jerry Linenger." I thought, "How does he know me?" And I said, "You're all teachers? Where are you from?" "No, we're a film crew." I looked over and saw Tom Hanks standing there and Ron Howard. Ron Howard is about my age and he was excited during the moon days even though he was Opie on the *Andy Griffith Show*. He was asking me questions just like a wide-eyed kid. When I walked away, I had to laugh. Here are folks people normally approach for autographs and now it was just the opposite. They were excited to meet me!

Those of us on the ground the day you were launched were sitting on the edge of our seats wondering whether you were going or not. The weather was a real problem. I'm sure that must have been the subject of some discussion up in the shuttle.

We had already been sitting there for an hour and a half or so into our launch window waiting for the weather to improve. Suddenly, Dick Richards, the commander, looked out and said, "I don't believe it! Look out the window." We all peeked out and saw a big rainbow from one of the windows. And when we looked out the other window we could see the other end. When we saw that rainbow we knew we were going. It was an omen. Sure enough, 5 minutes later they resumed the count.

And once it resumed, it was quick.

My wife said it was the fastest 5 minutes in her life. I know it was very emotional. I talked to a lot of people since then—family and friends. It's a real emotional thing seeing that launch. You expect something big and fantastic but it's beyond anything you can imagine.

I know you've been asked this a million times but I'm going to ask you again. What's it like when those engines ignite?

It's very much what you imagine it to be. It feels like you're in the middle of a herd of buffalo that are stampeding. Dust is flying, the ground is shaking, and you're part of the flow of things. You realize that you can't make a sudden right turn if you want to. You're going to have to go with the flow. The first 2 minutes before the solid boosters came off, it was just shaking and rumbling, switches are doing this, and just to see anything is very difficult because everything is moving. A real low rumble hits you like a bass drum deep in the chest. You get pushed back pretty hard into your seat. For those 2 minutes before the solids come off, it's more like you're inside a big tin can getting shaken around. I chuckled. It's got six and a half million pounds of thrust and it's a joke to think we were in control. It will go where it was designed to go. The first 2 minutes don't feel like you're flying fast. It feels like you're inside a volcano. When the solids came off, there were big explosions that sounded like cannons. Once those solid boosters are gone the vehicle is flying on just the three main engines and it settles down. It feels like you're in a fine race car just accelerating and you get pushed into your seat harder and harder.

This sequence lasts for about 6 minutes. The last 2 minutes of that segment you get pushed back in your seat pretty good as you pull about 3 Gs. Three Gs pushing on your chest feels like you have three people lying on top of you. Remember when you were a kid? It was okay when your brother was on top of you but when your two sisters jumped on too it was too much. That's the feeling. It gets a little uncomfortable. Then the engines cut off and it's hard to describe. It's day and night. It's one of the sharpest contrasts I've ever experienced. One minute I'm getting yanked back in my seat and the next instant I'm floating. You go from intense discomfort to a freedom of floating. All the pressure is off like you've never experienced in your life. And you have to realize that all of this has happened in just a few minutes. From launch to engine cutoff is only about 8 minutes. In those 8 minutes you go from 0 to 17,500 mph! So you're really hauling, no doubt about it.

Were you still in your restraints after engine cutoff?

Yes. But they were very loose. The minute that transition occurred I had a job to do. Once we got to main engine cutoff and the systems looked okay, I was to photograph the external tank. It's important to observe it to see that there hasn't been any damage for the sake of future flights. So the only chance to photograph it is right after separation while it's rotating and we're moving away. As soon as the engines cut off I had to get out of my straps and parachute, reach back and grab the camera, and get the lenses on it. Then immediately I floated to the overhead window. Because of the delay, we went into darkness very quickly so I only got to snap two pictures.

After everything went dark, that was the first time I had a chance to just sit back and think about it and it was at that point I thought, "Wow, I'm floating! I'm in space. This is great!"—JKH

To be concluded in the September-October issue.

Survivor of the *Indianapolis*

Photo by Editor

Dr. Haynes today

In July 1945 the war in the Pacific neared its climax. The costly battle for Okinawa was over and planners were fine-tuning strategy for the invasion of the Japanese home Islands.

In the New Mexico desert near Alamogordo, physicists of the Manhattan Project achieved their goal, detonating a nuclear weapon perched atop a 100-foot-high steel tower. Its use might now make the invasion of Japan unnecessary.

Meanwhile, USS Indianapolis *(CA-35) had just undergone extensive repairs at the Mare Island Naval Shipyard in California following a devastating kamikaze attack near Okinawa on 31 March, an incident that cost the heavy cruiser nine dead.*

The former Fifth Fleet flagship now received a highly classified assignment—to carry to Tinian the essential components for "Little Boy," the Hiroshima atomic bomb.

Having delivered its deadly cargo, Indianapolis *would have another distinction as well. She would be the last U.S. warship to be sunk in World War II. Traveling alone on 29 July, she was torpedoed by a Japanese submarine. Although some 800 members of her 1,199-man crew got into the water, 4 1/2 days passed before rescuers arrived. Only 316 were pulled from the ocean. The pathetic story of* Indianapolis *and her crew has been told and retold many times, yet the horror of the tragedy which cost the lives of 880 men is no less appalling 50 years later. For the precious few fished alive from the shark-infested Philippine Sea, memories are still vivid. So are the enduring nightmares.*

CAPT Lewis L. Haynes, MC (Ret.), Indianapolis's *senior medical officer, tells how it was.*

Delivering the Bomb

After our repairs were completed, we were supposed to go on our post-repair trial run. But instead, on July 15th, we were ordered to go to San Francisco to take on some cargo. I was amazed to notice that there was a quiet, almost dead Navy Yard. We tied up at the dock there and two big trucks came alongside. The big crate on one truck was put in the port hangar. The other truck had a bunch of men aboard, including two Army officers, CAPT [James F.] Nolan and MAJ [Robert R.] Furman. I found out later that Nolan was a medical officer. I don't know what his job was, probably to monitor radiation. The two men carried a canister, about 3 feet by 4 feet tall, up to ADM Spruance's cabin where they welded it to the deck. Later on, I found out that this held the nuclear ingredients for the bomb and the large box in the hangar contained the device for firing the bomb. And I had that thing welded to the deck above me for 10 days!

As we got under way on July 16th, CAPT McVay told his staff we were on a special mission. "I can't tell you what the mission is. I don't know myself but I've been told that every day we take off the trip is a day off the war." CAPT McVay told us his orders were that if we had an "abandon ship," what was in the admiral's cabin was to be placed in a boat before anybody else. We had all kinds of guesses as to what the cargo was.

After refueling at an eerily quiet Pearl Harbor, we made a straight run to Tinian at as much speed as they could economically go, about 25 or 26 knots. Everybody was at Condition Able which was 4 hours on, 4 hours off. It was like going into battle the whole way out. The trip from San Francisco to Tinian took a total of 10 days.

When we unloaded our special cargo at Tinian I noticed a couple of general Air Force officers handling these crates like they were a bunch of stevedores. I was even more sure we had something important.

We were then ordered to the Philippines for training exercises preparing for the invasion of Kyushu. CAPT McVay asked for an escort, but was told we didn't need one as it was supposedly safe to go to the Philippines. What he wasn't told was that there were Japanese submarines along that way and that Naval Intelligence knew it.

Naval Historical Center

Torpedo Hit

On July 29th I was pretty tired because I had given the whole crew cholera shots all day. I remember walking through the warrant officer's quarters and declining to join a poker game as I was so tired. I then went to bed.

I awoke. I was in the air. I saw a bright light before I felt the concussion of the explosion that threw me up in the air almost to the overhead. A torpedo had detonated under my room. I hit the edge of the bunk, hit the deck, and stood up. Then the second explosion knocked me down again. As I landed on the deck I thought, "I've got to get the hell out of here!" I grabbed my life jacket and started to go out the door. My room was already on fire.

I emerged to see my neighbor Ken Stout. He said, "Let's go," and stepped ahead of me into the main passageway. I was very close to him when he yelled, "Look out!" and threw his hands up. I lifted the life jacket in front of my face, and stepped back. As I did, a wall of fire went "Whoosh!" It burned my hair off, burned my face, and the back of my hands. That's the last I saw of Ken.

I started out trying to go to the forward ladder to go up on the fo'c'sle deck. There was a lot of fire coming up through the deck right in front of the dentist's room. That's when I realized I couldn't go forward and turned to go aft. As I did, I slipped and fell, landing on my hands. I got third degree burns on my hands—my palms and all the tips of my fingers. I still have the scars. I was barefooted and the soles of my feet were burned off.

Then I turned aft to go back through the wardroom. I would have to go through the wardroom and down a long passageway to the quarterdeck, but there was a terrible hazy smoke with a peculiar odor. I couldn't breathe and got lost in the wardroom. I kept bumping into furniture and finally fell into this big easy chair. I felt so comfortable. I knew I was dying but I really didn't care.

Then someone standing over me said, "My God, I'm fainting!" and he fell on me. Evidently that gave me a shot of adrenalin and I forced my way up and out. Somebody was yelling, "Open a porthole!" I can remember someone else yelling, "Don't light a match!" All the power was out and it was just a red haze.

The ship was beginning to list and I moved to that side of the ship. I found a porthole already open. Two other guys had gone out through it. I stuck my head out the porthole, gulping in some air, and found they had left a rope dangling. I looked down to see water rushing into the ship beneath me. I thought about going out the porthole into the ocean but I knew I couldn't go in there.

Instead I grabbed the rope which was attached to an overhanging floater net. I pulled myself through the porthole and up to the deck above. I then went to my battle station, which was the port hangar. My chief, [CPhM John A.] Shmueck, and a lot of casualties were back there. I think the moon was going in and out because at times I could see quite clearly, other times not. We were trying to put dressings and give morphine to badly burned men when an officer came up and said, "Doctor, you'd better get life jackets on your patients."

So Shmueck and I went up a ladder to the deck above where there were some life jackets. We got a whole bunch of life jackets and went back down and started to put them on the patients. I remember helping a warrant officer. His skin was hanging in shreds and he was yelling, "Don't touch me, don't touch me." I kept telling him we had to get the jacket on. I was putting the jacket on when the ship tipped right over. He just slid away from me. The patients and the plane on the catapult all went down in a big, tangling crash to the other side. I grabbed the lifeline and climbed through to avoid falling. And by the time I did, the ship was on its side. Those men probably all died as the plane came down on top of them. All the rescue gear and everything we had

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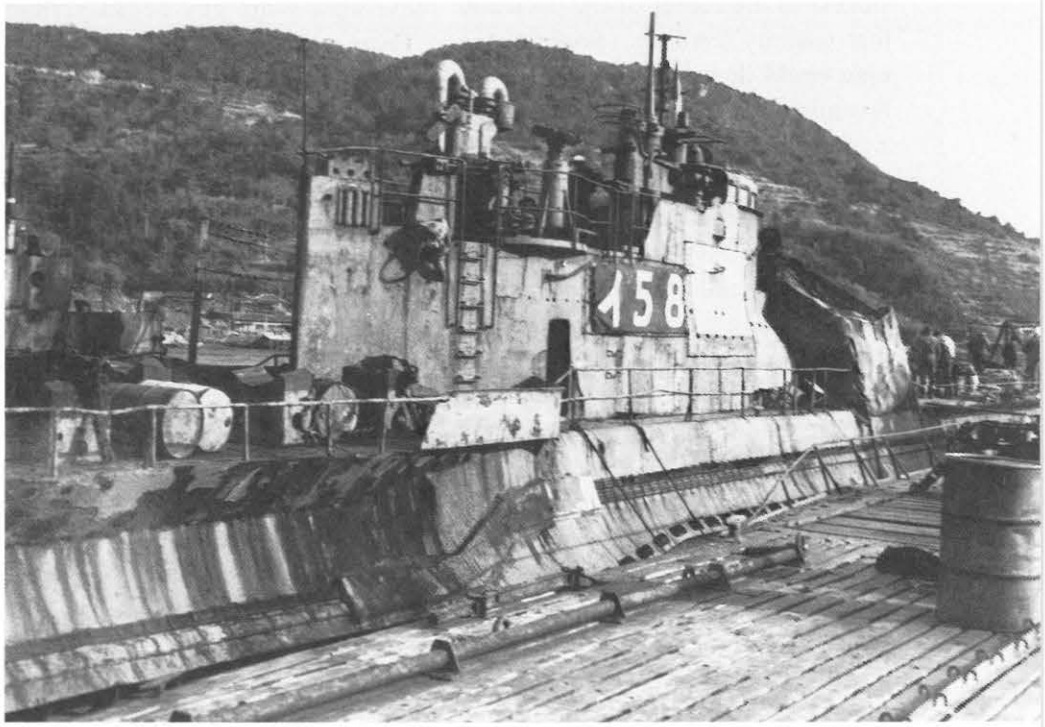


Left: USS *Indianapolis* (CA-35) at Mare Island shortly before taking on her top secret cargo. Right: I-58, the Japanese sub that sank *Indianapolis* at Sasebo, Japan, January 1946.

out went down, patients and everything together.

Into the Water

I slowly walked down the side of the ship. Another kid came and said he didn't have a jacket. I had an extra jacket and he put it on. We both jumped into the water which was covered with fuel oil. I wasn't alone in the water. The hull was covered with people climbing down.

I didn't want to get sucked down with the ship so I kicked my feet to get away. And then the ship rose up high. I thought it was going to come down and crush me. The ship kept leaning out away from me, the aft end rising up and leaning over as it stood up on its nose. The ship was still going forward at probably 3 or 4 knots. When it finally sank, it was over a hundred yards from me. Most of the survivors were strung out anywhere from a half mile to a mile behind the ship.

Suddenly the ship was gone and it was very quiet. It had only been 12 minutes since the torpedoes hit. We started to gather together. Being in the water wasn't an unpleasant experience except that the black fuel oil got in your nose and your eyes. We all looked the same, black oil all over—white eyes and red mouths. You couldn't tell the doctor from the boot seaman. Soon everyone had swallowed fuel oil and gotten sick. Then everyone began vomiting.

At that time, I could have hidden but somebody yelled, "Is the doctor there?" And I made myself known. From that point on—and that's probably why I'm here today—I was kept so busy I had to keep going. But without any equipment, from that point on I became a coroner.

A lot of the men were without life jackets. The kapok life jacket is designed with a space in the back. Those who had life jackets that were injured, you could put your arm through that space and pull them up on your hip and keep them up out of the water. And the men were very good about doing this. Furthermore, those with jackets supported men without jackets. They held on the back of them, put their arms through there and held on floating in tandem.

When daylight came we began to get ourselves organized into a group and the leaders began to come out. When first light came we had between three and four hundred men in our group. I would guess that probably seven or eight hundred men made it out of the ship. I began to find the wounded and the dead. The only way I could tell they were dead was to put my finger in their eye. If their pupils were dilated and they didn't blink I assumed they were dead. We would then laboriously take off their life jacket and give it to men who didn't have jackets. In the beginning I took off their dogtags, said The Lord's Prayer, and let them go. Eventually, I got such an armful of dogtags I couldn't hold them any longer. Even today, when I try to say The Lord's Prayer or hear it, I simply lose it.

Later, when the sun came up the covering of oil was a help. It kept us from burning. But it also reflected off the fuel oil and was like a searchlight in your eyes that you couldn't get away from. So I had all the men tie strips of their clothing around their eyes to keep the sun out.

The second night, which was Monday night, we had all the men put their arms through the life jacket of the man in front of him and we made a big mass so we could stay together. We kept the wounded and those who were

sickest in the center of the pack and that was my territory. Some of the men could doze off and sleep for a few minutes. The next day we found a life ring. I could put one very sick man across it to support him.

There was nothing I could do but give advice, bury the dead, save the life jackets, and try to keep the men from drinking the salt water when we drifted out of the fuel oil. When the hot sun came out and we were in this crystal clear water, you were so thirsty you couldn't believe it wasn't good enough to drink. I had a hard time convincing the men that they shouldn't drink. The real young ones—you take away their hope, you take away their water and food—they would drink salt water and then would go fast. I can remember striking men who were drinking water to try and stop them. They would get diarrhea, then get more dehydrated, then become very maniacal. In the beginning, we tried to hold them and support them while they were thrashing around. And then we discovered we were losing a good man to get rid of one who had been bad and drank. As terrible as it may sound, towards the end when they did this, we shoved them away from the pack because we had to.

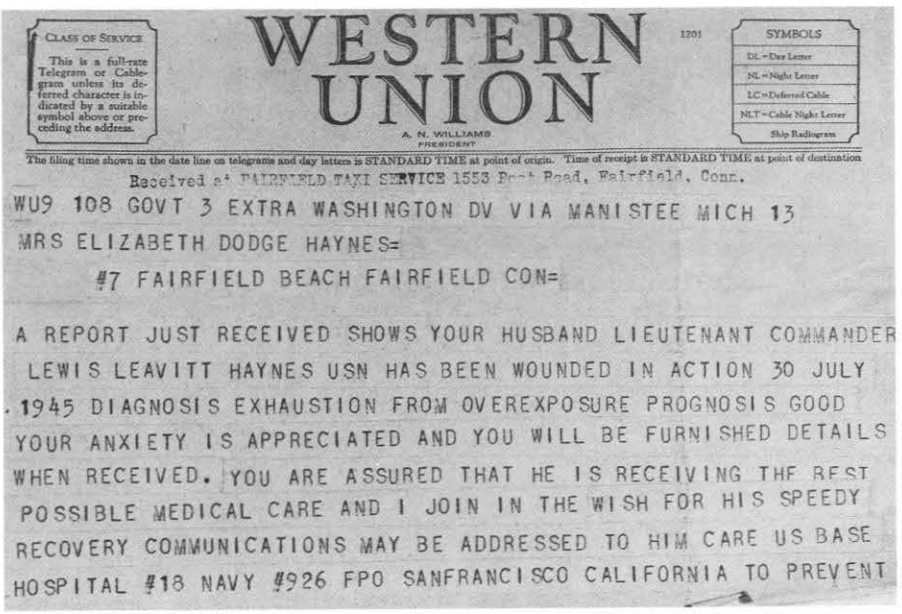
The water in that part of the Pacific was warm and good for swimming. But body temperature is over 98 and when you immerse someone up to their chin in that water for a couple of days, you're going to chill him down. So at night we would tie everyone close together to try to stay warm. But they still had severe chills which led to fever and delirium. On Tuesday night some guy began yelling, "There's a Jap here and he's trying to kill me." And then everybody started to fight. They were totally out of their minds. A lot of men were killed that night. A lot of men drowned. Overnight everybody untied themselves and got scattered in all directions. But you couldn't blame the men. It was mass hysteria. You became wary of everyone. Till daylight came, you weren't sure. When we got back together the next day there were a hell of a lot fewer.

There were also mass hallucinations. It was amazing how everyone would see the same thing. One would see something, than someone else would see it. One day everyone got in a long line. I said, "What are you doing?" Someone answered, "Doctor, there's an island up here just ahead of us. One of us can go ashore at a time and you can get 15 minutes sleep." They all saw the island. You couldn't convince them otherwise. Even I fought hallucinations off and on, but something always brought me back.

I only saw one shark. I remember reaching out trying to grab a hold of him. I thought maybe it would be food. However, when night came, things would bump against you in the dark or brush against your leg and you would wonder what it was. But honestly, in the entire 110 hours I was in the water I did not see a man attacked by a shark. However, the destroyers that picked up the bodies afterward found a large number of those bodies. In the report I read 56 bodies were mutilated. Maybe the sharks were satisfied with the dead; they didn't have to bite the living.

Rescue

It was Thursday [2 Aug] when the plane spotted us. By then we were in very bad shape. The kapok life jacket becomes waterlogged. It's good for about 48 hours. We sunk lower down in the water and you had to think about keeping your face out of water. I knew we didn't have very long to go. The men were semicomatose. We were all on the verge of dying when suddenly this plane flew over. I'm here today because someone on that plane had a sore neck. He went to fix the aerial and got a stiff neck and lay down in the blister underneath. While



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MRS ELIZABETH DODGE HAYNES=

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A REPORT JUST RECEIVED SHOWS YOUR HUSBAND LIEUTENANT COMMANDER LEWIS LEAVITT HAYNES USN HAS BEEN WOUNDED IN ACTION 30 JULY 1945 DIAGNOSIS EXHAUSTION FROM OVEREXPOSURE PROGNOSIS GOOD YOUR ANXIETY IS APPRECIATED AND YOU WILL BE FURNISHED DETAILS WHEN RECEIVED. YOU ARE ASSURED THAT HE IS RECEIVING THE BEST POSSIBLE MEDICAL CARE AND I JOIN IN THE WISH FOR HIS SPEEDY RECOVERY COMMUNICATIONS MAY BE ADDRESSED TO HIM CARE US BASE HOSPITAL #18 NAVY #926 FPO SANFRANCISCO CALIFORNIA TO PREVENT

Courtesy Dr Lewis Haynes

Mrs. Haynes received this telegram concerning the condition of her husband.

he was rubbing his neck he saw us.

The plane dropped life jackets with canisters of water but the canisters ruptured. Then a PBY showed up and dropped rubber life rafts. We put the sickest people aboard and the others hung around the side. I found a flask of water with a 1-ounce cup. I doled out the water, passing the cup down hand to hand. Not one man cheated and I know how thirsty they were.

Towards the end of the day, just before dark, I found a kit for making fresh water out of salt water. I tried to read the instructions, but couldn't make sense of it or get it to work right. My product tasted like salt water and I didn't want to take a chance so I threw it into the ocean. I then went to pieces.

I watched the PBY circle and suddenly make an open-sea landing. This took an awful lot of guts. It hit, went back in the air and splashed down again. I thought he'd crashed but he came taxiing back. I found out later he was taxiing around picking up the singles. If he hadn't done this, I don't think we would have survived. He stayed on the water during the night and turned his searchlight up into the sky so the *Cecil J. Doyle* (DE-368) could find us. The ship came right over and began picking us up.

The *Cecil J. Doyle* had a big net down over the side. Some of the sailors came down the side of the netting and pulled our rafts up alongside. They put a rope around me; we were too weak to climb up. I remember bouncing off the side of the ship as they hauled me up. When they tried to grab hold of me I remember saying, "I can get up!" But I couldn't. Two sailors dragged me down the passageway. By the wardroom pantry, someone gave me a glass of water with a mark on it and would only give me so much water. I drank it and when I asked for more, he said that was all I could have this time. Then the skipper asked me what ship I was from. I told him we were what was left of the *Indianapolis*.

Courtesy Dr. Lewis Haynes

CDR Eugene Owen, MC, examines Dr. Haynes' dressings at the hospital in Guam. *Indianapolis* skipper, CAPT Charles B. McVay, stands at right.

The next thing I knew, I was sitting in a shower. I remember corpsmen or seamen cleaning off my wounds, trying to wash the oil from me and dress my burns. I remember trying to lick the water coming down from the shower. They put me in a bunk and I passed out for about 12 hours. I recall the first bowel movement I had after I was picked up. I passed pure fuel oil. The other fellows found the same thing.

The *Cecil J. Doyle* took us to Peleliu. We were taken ashore and put into hospital bunks. I remember they came in and got our vital statistics—we had discarded our dogtags because they were heavy. They changed our dressings. Some of the men got IVs, though I didn't. While there I began to eat a little and get some strength back.

Then after 2 or 3 days at Peleliu, someone came in and said that I was going to Guam. The next thing I knew, they hauled me out on a stretcher and onto a hospital ship.

The commanding officer of the ship, a friend of mine, was Bart [Bartholomew, Surgeon General of the Navy, 1955-1959] Hogan. Bart came in and said, "I know you don't feel well but you're going to have to go before the Inspector General. I'm going to send a corpsman in and I want you to start at the beginning and dictate everything you can remember about what happened because as time goes on you're going to forget and things are going to change."

So I sat down and dictated off and on for 3 days on the way to Guam. When I'd get tired I'd fall asleep and then I'd wake up and he'd come back.

When we landed, Bart gave me a copy of what I dictated and I took it when I went to the Inspector General's office. I told my story, answered their questions, and gave them this report unedited, saying, "Here it is. This is probably as accurate as I can be." And that document is the file at the Inspector General's office. All the people who wrote books about the *Indianapolis* used it.

Normally, I don't have the nightmares. Last night, I didn't sleep well. And I won't sleep well tonight. But eventually my mind will turn off and I'll be all right. It's like when I try to say The Lord's Prayer or I sit down and try to talk to somebody about it. I'm all right as long as I stay away from talking about individuals—my friends. . . . I was on that ship over a year and a half and we were all close friends and we'd been through a lot together and I knew their wives and their families. As a doctor you get more intimate than normal.—JKH

Photos from BUMED Archives

USS *Consolation* (AH-15)

50 Years Ago— World War II and the Navy Nurse

Kathi Jackson

Since 1991, the 50th anniversary of almost every major battle of World War II has been remembered and its gallant fighting men praised. Little has been said, however, about the nurses who took care of them after these battles, women who volunteered to go in harm's way to provide these men with the medical care and comfort they needed.

In 1945 there were approximately 11,000 Navy nurses serving all over the globe in more than 300 naval stations, 43 naval hospitals, 14 Navy hospital ships, and six hospital corps schools. They were also flying countless air miles evacuating the wounded. Although the war would end in 1945, for most of these women the year began as just as any other long struggle to save lives.

For 11, however, it meant freedom—freedom from captivity that began when the Japanese seized the

Philippines in January 1941. The nurses, stationed at Canacao Naval Hospital in Manila, were first taken to a camp at Santo Tomas. In 1943 they were transferred to Los Banos where they organized and ran a 25-bed hospital for 3,000 internees until their rescue on 23 Feb 1945. One family of internees said this of the nurses: "We who were in camp will never be able to forget or repay them for the many favors that they did for one and all there. We are absolutely certain that had it not been for these nurses many of us who are alive and well would have died. Their unselfish care and human understanding in the most trying circumstances will always be in our hearts."(*1*) The 11 nurses were chief nurse Laura M. Cobb, Dorothy Still, Mary Chapman, Bertha Evans, Helen Gorzelanski, May Rose Harrington, Margaret Nash, Goldia O'Haver, Eldene Paige, Susie Pitcher, and Edwina Todd.

February 1945 also saw the expansion of naval air evacuation. C-47 transport planes, designated R4D's by the Navy, picked up wounded from forward areas and took them to Guam. There were also routes from Guam to Pearl Harbor and from Pearl Harbor to the continental U.S. One nurse and one corpsman were responsible for administering medications and blood, dressing wounds, and feeding all patients on each flight. Each of the first 12 "pioneer" Navy flight nurses received a commendation "For excellent service as a flight nurse in the forward area, Central Pacific, during the first quarter of 1945, for participation in numerous areas of the Pacific ocean and contributing materially in the successful evacuation of wounded from the battle area of Iwo Jima. The skill, care of patients, and devotion to duty throughout were worthy of the highest praise."(*2*)

The next several months found Navy nurses treating the casualties of Iwo Jima and Okinawa. LT Alice Goudreau, stationed on Guam, said that during the worst days of the battle there were 400 incoming a day. Many arrived at the hospital still holding onto their weapons and covered with black volcanic ash—"grim proof," she said, "that the field hospitals, on the beaches of Iwo, were a far cry from the safe sanctuary a hospital should be."(*3*)

Goudreau saw almost every type of injury and illness: arm and leg amputations, gunshot wounds, appendectomies, tracheotomies, dysentery, gastroenteritis, malaria, and psychoneuroses. There were head, abdominal, and spinal injuries; and partial or full paralysis cases. Pressure sores were especially prevalent among men who had spent several days waiting to be evacuated because the sores were caused by waiting on beaches in canvas cots and litters under rough, wet, field blankets. There were burn injuries caused by flame throwers, gasoline explosions, fiery airplane crashes, or swimming through oil-filled water. And burn wards created an odor that isn't easily forgotten, said Goudreau, an odor so bad that a Red Cross worker—"a true angel of mercy"—sprinkled cologne on sheets and pillows to erase the smell long enough for the men to eat lunch.(*4*)

Some of the most challenging cases were gunshot wounds to the chest because in most cases "the bullet had penetrated the abdominal cavity or lodged in the spine."(*5*) In addition to having a sucking wound of the chest, the patient often had a colostomy or paralysis which meant they had no control over their bowels or bladders. Most patients with chest wounds also needed oxygen usually administered through nasal catheters. Face masks, said Goudreau, were of little use to us as the patients were highly apprehensive, frequently irrational, and would often tear them off."(*6*) Oxygen tents weren't practical either, she said, because the rubberized material deteriorated in the humid climate "where leather shoes grow green with mold overnight."(*7*) Because of the nasal catheters, blood transfusions, and intravenous feedings, "a casual observer entering the ward housing our patients with chest wounds would have been positive we held them together with rubber tubes!" According to Goudreau, it "resembled experiments a la Frankenstein."(*8*)

Their brain surgery ward was full during the campaign, and although these patients were evacuated as soon as possible, "even the 'convalescents' were an ever-present source of worry," said Goudreau. "A young marine with a healing head wound, carrying a sliver of shrapnel deep in the brain, might be a gay, happy youngster in the morning and become violent, irrational, or go into a series of convulsions before the day was over."(*9*) And because these cases presented such a terrific strain on the nurses, the women were chosen very carefully for the duty. They had to be experienced in surgical nursing, preferably in neurosurgery.

Most of their ambulatory patients were the neuropsychiatric cases. The large number of men with war neuroses was almost unbelievable. They arrived by the hundreds. These were the traditionally tough marines, experienced campaigners, who with outstanding gallantry had established beachhead after beachhead in the islands of the Pacific. Most of them, some little more than boys, were in such a severe state of shock that they had to be led by the hand from the planes and ambulances.(*10*)

"Shell shock" victims exhibited loss of appetite, lost of weight, in-

ENS Jane Kendeigh, first Navy flight nurse to "see" action on a battlefield, cares for her patients aboard a naval air transport plane from Okinawa.

somnia, headache, and "startle" reactions to the slightest noise, even the slam of a door produced uncontrollable quivers in every muscle." Even after days of treatment with drug-induced sleep and cold packs, the sound of a siren "would send them scurrying into corners and under their beds in quivering, stuttering huddles." The rehabilitative efforts would then have to be repeated.(*11*)

Similar to "shell shock" was fear of shells. This was because the constant, hellish din of bursting shells during the early days of the campaign was described by many observers as almost beyond human endurance. Some were victims of bomb blasts. Others lost control when a close shellburst blasted their buddies to bits before their eyes. One of the marines said, "It was as if a giant meat grinder had passed through our lines and left thousands of chopped bodies in its wake."(12)

The women, said Goudreau, were "average American nurses, well trained but with little more than special or general duty experience," but they always amazed touring supervisors who often found that "the nurses with the best-managed wards had had but a few years experience in civilian nursing." One of the words used to describe these young women was "adaptable," a very crucial trait because their patients weren't just men who were hurt physically, but men who were often scared and homesick. "Even the toughest marine, when wounded, was just another homesick American boy yearning for home and his loved ones."(*13*)

But nothing gave our nurses a keener sense of accomplishment," recalled Goudreau, "then to be able to bid Godspeed to a paralyzed marine who was leaving the hospital after several weeks of care, with his wounds healing and the rest of his skin intact."(*14*)

Before the battle of Iwo Jima, LTJG Olivine St. Peter said her patients on Guam "might have been in any Navy hospital," though the admission of two wounded Japanese made her realize "that we were in a forward area."(*15*) But the new and nearly empty hospital soon filled with casualties who were quickly bathed and treated. Twenty to thirty casts were put on every day for about 3 weeks, and 22 severe head injuries were admitted in the first 2. Some patients were blind, some were paralyzed or had other spinal injuries, and some had ulcers—either upon arrival or due to traveling after their immediate care. St. Peter recalls that the prognosis of men with gunshot wounds and neck and spinal injuries was poor. "All had high elevations of temperature by the fifth day; one lived 10 days."(*16*)

LT Sarah O'Toole arrived on Tinian in the Marianas in early 1945, to a configuration of Quonset huts, all connected by ramps. The nurses stayed in huts built for 12 but partitioned so there were two nurses to a bedroom and one central reception area. Their bathing facilities, in another hut, included showers, laundry tubs, hot water, and "most important, flush toilets."(*17*) The large and well-maintained hospital grounds even included an outdoor movie screen/stage. Its bed capacity grew from 600 to 1,000.

One of the primary duties of the Navy nurse was to train corpsmen so they could treat the sailors on ships

where women aren't allowed. In the hospitals they worked together, but on some occasions the men resented the nurses' arrival. O'Toole says that at Tinian it was quite understandable. After all, the men "had worked for several months without nurses . . . . When they realized that we admired them and had no feeling that they could not get along without us, they were no longer resentful and are now giving wholehearted co-operation."(*18*)

LCDR Ruth Dunbar was sent to the Philippines in the last months of 1945 and at first saw cases similar to those in any hospital. Then survivors began to come in. Some of the first were survivors of a ship sinking, and while they were naturally angry about losing their ship, they hadn't been in the water too long and were in pretty good shape, and the loss of life was relatively low. Unfortunately, that couldn't be said for the survivors of the *Indianapolis:* who "came limping into the ward on legs disabled by salt water ulcers and feet swollen from sun and exposure . . . ."(*19*) This was a real tragedy, says Dunbar, "So few saved from so many." The survivors had been in the water almost 5 days when they were picked up.(*20*)

The nurses did what they could—aniline dyes and calamine lotion, baths, wet dressings—to help their patients recover from various jungle-caused skin diseases like acnes, eczematoid dermatitis, atypical lichenoid dermatitis, and prickly heat. Scrub typhus, the local tropical disease, came from mites found in the jungle or carried in rodents and, though treated with blood or serum, oxygen, and other measures, it was often deadly.

Some Navy nurses experienced horrors unrelated to wartime. In June, while serving on the hospital ship *Benevolence* (AH-13), LT Pauline (Polly) Glines experienced Mother Nature at her fiercest when a "two headed monster typhoon split in two," and one of the "heads" attacked the *Benevolence* and anther hospital ship. As the nurses were being told to report to sick bay because the ship might be hit by "very rough water and hurricane winds," Glines was thrown across her room by the impact of a giant wave. In a few moments she was escorted to sick bay (where beds and patients were anchored) by a corpsman after he tied a rope around both their waists. The ship, says Glines, wasn't suited for such weather and was in danger of capsizing. Though all turned out well, it was an experience she wasn't to forget: "I have never been so scared before, and hope never to be so scared again!"(*21*)

Helen Gorzelanski (standing) and Dorothy Still primp before a mirror after their first warm-water bath since internment in the Philippines.

Another nurse, ENS Alice Lofgren Andrus, also witnessed Mother Nature's wrath at sea. It was 17 Sept 1945, and the ship was the *Consolation* (AH-15). One day I will never forget, our ship was going through the edge of a typhoon. Everything was "secured" as we plowed through high waves that rocked the ship, rolling side to side as well as pitching fore and aft. No one was allowed topside without authorization since the un-

Navy nurses, rescued after 37 months of Japanese internment in the Philippines, dine with ADM Thomas Kinkaid, Commander 7th Fleet and Southwest Pacific Force, and his staff at headquarters in the Philippines.

wary could easily be washed over the side and lost. We made good use of handrails in the passageways as we moved from one part of the ship to another.

During storms, mealtimes were mostly sandwiches. In this heavy weather the corpsmen served us each a plate with a sandwich. The large tables were bolted to the floor, but as we sat in our chairs, and the ship started to roll, some of us instinctively grabbed our plates as our chairs slid several yards to the right. Others had a firm hold on the table, so their chairs stayed in place, and their plates slid promptly to the floor. Soon the ship rolled to the left, and we slid back to our places at the table. With remarkable efficiency, the corpsmen soon brought more sandwiches and cleaned up the spills. But some teasing and laughter continued for days afterward. We had quickly learned how to cope with eating in stormy weather.(*22*)

Just a few days earlier, the *Consolation* had picked up Allied POWs at the Japanese port of Wakayama. There Andrus and nine other nurses had gone ashore and set up a temporary hospital. Their patients were a sad sight, she says: "Many were emaciated and weak, some limping or using makeshift crutches. . . . Soon our few corpsmen hurried up the road with stretchers and carried back the weakest ones." The nurses took charge of bathing the men, giving them clean pajamas, and treating rashes or special problems. They were then taken to the ship for more medical care and rest. "Most of the former prisoners were American, but some were British, Australian, or from countries where I couldn't understand their language. But sign language was adequate: smiles and happy gestures let us know that they were just as thankful to be rescued as the ones who tried to express their feelings in words, or who quietly shed a few happy tears."(*23*)

Although the Navy nurses of World War II haven't received much mention in history books, those who witnessed their expertise and compassion were quick to praise them. In November 1944, Fleet Admiral Chester W. Nimitz said: "These nurses bring to the hospital organizations in the Pacific War Theater the high standard of nursing service provided in naval hospitals in the United States. Their specialized knowledge and training and their devotion to duty are invaluable in providing the excellent hospital care given our sick and wounded."(*24*)

ADM W.F. Halsey also had words of praise for Navy nurses: Many times amidst primitive living conditions and often in trying circumstances these women, far from home, many for the first time, conducted themselves in a manner their country may well be proud of. Their untiring services, their professional skill, and their ability to sustain the unparalleled morale of the wounded in their care, will always reflect the highest credit to the Nurse Corps, United States Navy.(*25*)

But perhaps the best compliment was paid by GEN Jonathan Wainwright as he, one of the many former POWs, came aboard the *Benevolence:* "The sight of the beautiful Navy nurses was the best medicine an American could have."(*26*)

References

1. Former internees pay tribute to Navy nurse internees. *Am J Nurs.* October 1945:856.
2. Bureau of Medicine and Surgery, U.S. Navy. *White Task Force.* NAVMED 939;1945.
3. Goudreau AA. Nursing at an advance naval base hospital. *Am J Nurs.* November 1945:885.
4. Ibid., p 886.
5. Ibid.
6. Ibid.
7. Ibid.
8. Ibid.
9. Ibid., p 885.
10. Ibid.
11. Ibid., p 886.
12. Ibid.
13. Ibid.
14. Ibid., p 885.
15. St. Peter OB. In the Southwest Pacific: the Marianas. *Am J Nurs.* December 1945:1012.
16. Ibid., p 1013.
17. O'Toole S. In the Southwest Pacific: they pioneered on Tinian. *Am J Nurs.* December 1945:1014.
18. Ibid., p 1015.
19. Dunbar RB. Return to the Philippines. *Am J Nurs.* December 1945:1017.
20. Ibid.
21. Glines EL. *Heads in the Sand.* Los Angeles, CA. Authors Unlimited; 1990:42.
22. Andrus AL. Random Navy memories, unpublished, November 1993.
23. Andrus AL. A moment in history, unpublished, March 1993.
24. *White Task Force.*
25. Ibid.
26. *Heads in the Sand,* p 51.

Bibliography

Andrus AL. A moment in history, unpublished, March 1993.

Andrus AL. Random Navy memories, unpublished, November 1993, pp 1-3.

DeWitt G. *The First Navy Flight Nurse on a Pacific Battlefield.* Fredericksburg: Admiral Nimitz Foundation; 1983.

Dolan JA. *History of Nursing.* 12th ed. Philadelphia, PA: W.B. Saunders; 1968.

Dunbar RB. Return to the Philippines. *Am J Nurs.* December 1945:1015-1018.

Former internees pay tribute to Navy nurse internees. *Am J Nurs.* October 1945:856.

Glines EL. *Heads in the Sand.* Los Angeles, CA: Authors Unlimited; 1990.

Goudreau AA. Nursing at an advance naval base hospital. *Am J Nurs.* November 1945:884-886.

Herman JK. Dorothy Still Danner: reminiscences of a nurse POW. *Nav Med.* May-June 1992;83(3):36-40.

Jopling LW. *Warrior in White.* San Antonio, TX. The Watercress Press; 1990.

O'Toole S. In the Southwest Pacific: they pioneered on Tinian. *Am J Nurs.* December 1945:1012-1015.

St. Peter OB. In the Southwest Pacific: the Marianas. *Am J Nurs.* December 1945:1012-1015.

U.S. Navy Department. Outline history of the Navy Nurse Corps. Bureau of Medicine and Surgery fact sheet, p 6.

U.S. Navy Department. Bureau of Medicine and Surgery. *White Task Force.* NAVMED 939; 1945. ❑

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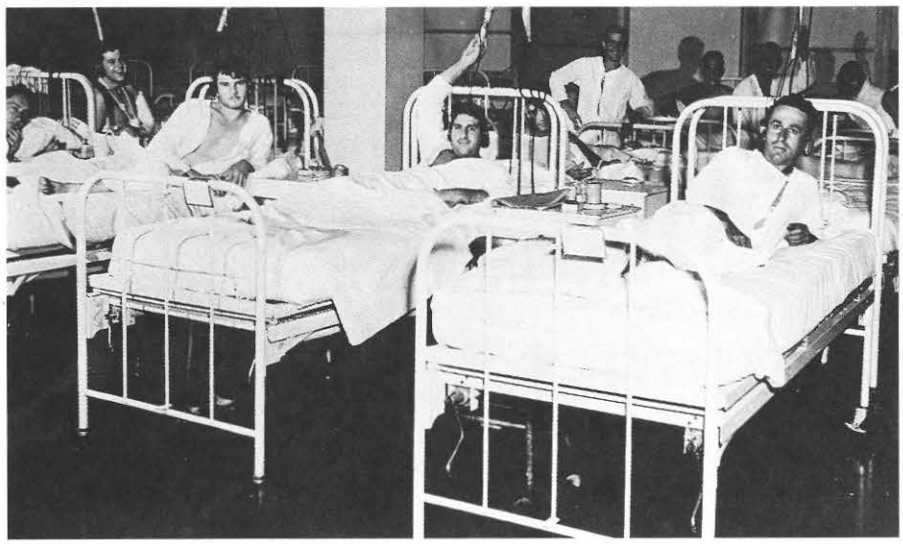
Navy Medicine July-August 1945

LCDR George Martin, USNR

Photos from BUMED Archives

Waving flags of the United States, Great Britain, and Holland, Allied POWs at Omori near Yokohama wildly cheer their approaching U.S. Navy rescuers as they bring food, clothing, and medical supplies.

In August 1945 the Second World War was brought to an abrupt end by a pair of titanic flashes over Japan. The twin detonations over Hiroshima and Nagasaki brought closure to the most devastating conflict in human history and simultaneously ushered in the nuclear age. The first bomb was dropped by a B-29 over Hiroshima on 6 Aug and cost the lives of 80,000 of the cities 350,000 inhabitants.(1) On 9 Aug a second device was used against the city of Nagasaki with great loss of life and presented the medical community with the horror of treating not just those injured in the bombing, but the many thousands who would suffer and eventually die as a result of radiation poisoning.(2) As terrible as these events were, they prevented the invasion of the Japanese home islands which, with Russia still uncommitted to action, would probably have been an all American show. The planned invasion would have involved an initial landing force of 13 combat divisions (10 Army, 3 Marine) supported



Patients at Naval Hospital Aiea Heights, Hawaii, hear the radio announcement that the Japanese have accepted the Potsdam surrender terms.

by an armada of 6,000 ships. The fanatical defense of Okinawa left little doubt in the minds of the planners that the cost of victory would have been extremely high.(3)

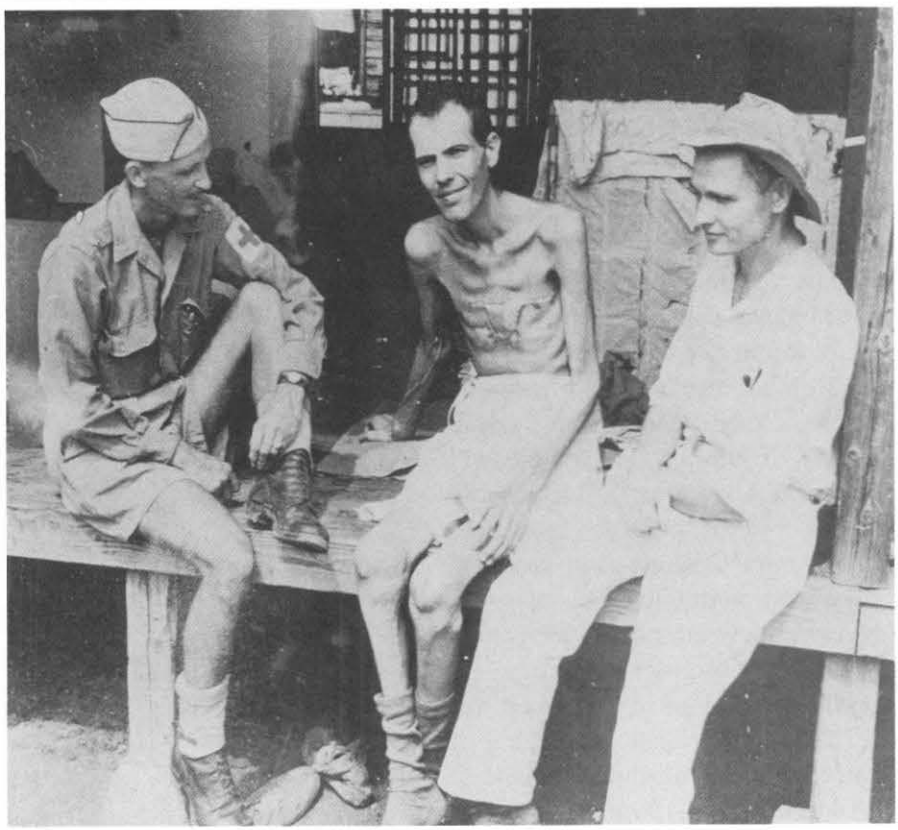
A tragic sidelight of the atomic bomb drops was the saga of the USS *Indianapolis* (CA-35). (See page 13) The ship was on a vital mission to deliver the components of the "Hiroshima Bomb" from San Francisco to the American forces on the Island of Tinian in the Marianas. After completion of this mission on 26 July, *Indianapolis* set sail for Leyte in the Philippine Islands for further assignment to Task Force 95 and the eventual invasion of Japan.(4) The great ship never reached Leyte because of the damage wrought by two "Long Lance" torpedo hits, compliments of the Japanese submarine I-58. The ship went down rapidly with approximately 800 of the 1,200 men assigned making it into the water alive. Their fight for survival would touch off one of the liveliest controversies in modern U.S. naval history. It took 84 hours to rescue the men who were constantly subjected to exposure, dehydration, death from wounds and, worst of all, shark attack. By the time they were rescued on 2 Aug only 316 men remained alive. The survivors were treated at Base Hospital 20 at Peleliu and aboard the hospital ship *USS Tranquillity* (AH-14). Many questions remain concerning the incident. Did the ship's captain take proper precautions? Was the Navy at fault for not providing escort ships and minimizing the Japanese submarine threat? Why wasn't the *Indianapolis* reported overdue in a timely manner? Was the ships commanding officer, CAPT Charles McVay, used as a scapegoat?

The cessation of hostilities did not alleviate the Navy Medical Department of continuing to provide for wounded troops, civilians, and liberated POWs. While the repatriation of casualties had been occurring via air and sea transport throughout the war, the flow of wounded came in earnest by the summer of 1945. In June more than 100,000 men arrived home, many to begin the ordeal of surgery and rehabilitation.(5)

Medical policy provided for the evacuation of the most serious casualties by air and left the arduous sea voyage to those less afflicted. Each wounded man arrived at stateside debarkation hospitals wearing a tag which denoting his diagnosis. These receiving hospitals continued the multilayered triage process which had begun at the battlefront. By war's end the arrival of almost 30,000 casualties a month gave the receiving hospitals the added incentive to move quickly and ship to other facilities all those patients who could possibly travel.(6)

In the days prior to computers, rapid communications, and other miracles of modern science, medical personnel relied on a great degree of flexibility and "command decision" making in order to provide quality integrated care. Collaboration of medical professionals was done at a distance of thousands of miles and without the benefit of personnel or even a telephonic conference. Treatment was based on the written diagnosis which accompanied the patient and "on the spot" observations of medical professionals.(7) Many of the returning wounded, who expected to be transferred to a facility nearest their home of record, were often sorely disappointed when these wishes were not granted. In fact, some ambulatory patients, when not receiving a home assignment, went "over the hill." Some stations reported up to a 15 percent rate of unauthorized absence!(8)

Medical personnel treated a legion of war-related injuries. Wounds caused by concussion, shrapnel, or burning were commonplace. Many of the returning warriors were full of metal fragments which invaded every part of the body. Shrapnel was found embedded "in the brain, eye, sinuses, lungs, heart, liver, scrotum, spinal canal, bones, joint, and muscles."(9) Amputations were frequent, dwarf-



A liberated POW suffers from severe malnutrition.

ing the number of cases in the First World War. Plastic surgeons worked endlessly to repair horribly disfigured veterans.

Perhaps the most heart-wrenching medical cases were those presented by the liberated POWs. American prisoners in the European theater of operations (ETO) were generally in better physical condition than their Pacific counterparts. The imminent defeat of Germany, and liberation by the onrushing Allied armies made repatriation and treatment comparatively easy. The only exception were those Americans freed by the Soviet Red Army who often experienced weeks of delay before being returned to their own forces. Even worse, hundreds of American GIs were shot, by their Soviet "liberators" who claim they mistook them for Hungarians.(10) However, in general the average American POW in Europe, now known as RAMP (repatriated allied military personnel) were processed without incident. Delousing, medical exams, special diets, vitamins, and the inevitable filling out of military forms was the order of the day for the POWs.

By contrast, the POWs in the Pacific Theater of Operations (PTO) did not fair as well as their ETO compatriots. Many were assigned to isolated camps in disease-ridden jungles. The abrupt end of the war in Asia allowed for little preparation for the eventual release of prisoners. Also, the Japanese code of Bushido looked at any who surrendered as unworthy of soldierly treatment. Many POWs, especially those held in Southeast Asia, were used as slave labor by their Japanese captors.

By war's end, a total of 176 POW camps holding 17,000 men existed in the Japanese home islands.(11) This did not include the camps of the Empire which stretched from Manchuria to Java and contained thousands of additional prisoners. With no U.S. troops present at the time of surrender, the liberation of these prisoners required several weeks to implement. In many camps the Japanese commanders could not bear the humiliation of surrender and refused to inform the POWs that the war was over. It was only the change in attitude of the guards, such as the issuance of extra rations, better physical treatment, and the return of stolen Red Cross packages that tipped off the POWs that something was happening.(12)

The liberation effort in the PTO was dual-staged. The first stage was "Operation Bird Cage" which involved the airdrop of thousands of leaflets formally announcing the surrender and ordering all prisoners to remain on station in their compounds. Phase two, code named "Operation Mastiff," was the airdropping of food, medical supplies, and rescue personnel into the camps.(13) Upon being liberated, prisoners were moved to hospital ships for examination, treatment, and further assignment. On 29 Aug the USS *Benevolence* (AH-13) entered Tokyo Bay and began its useful work of POW examination. In just 48 hours medical personnel evaluated 1,520 men. Of this group 320 men were considered ill enough for further treatment. All these men suffered from malnutrition. The remaining 1,200 were deemed well enough for stateside evacuation. (14)

Marked differences were apparent in the health of PTO POWs depending on their length of captivity and their place of internment. Long-term

A POW, too emaciated to walk, is gently carried aboard a small craft to be transported to a Navy hospital ship in Tokyo Bay. He was rescued from a Japanese camp in the Tokyo area.

prisoners showed a much greater propensity for malnutrition, muscular wasting, and skin ulcers. The health of those imprisoned in Japan varied according to the camp to which they were assigned. Camp Omori, Camp Ofuna, Shinegawa Hospital, and Kempi Headquarters had especially poor records of health and sanitation. The average Japanese camp provided a daily ration of 600 grams of a rice, barley, and rye mixture supplemented occasionally by greens, tea, soup, and small fish. Working prisoners received an additional 100 grams of basic diet, making the daily caloric intake between 2,100 and 2,450 calories.(15) The most fortunate prisoners were those who were "farmed out" as labor to local industrialists. These men had been comparatively well fed and were also in a position to steal additional food. A study on board *Benevolence* found that as a group, B-29 fliers suffered a greater degree of disability than their counterparts. This is because the aircrews were viewed as war criminals by the Japanese and were therefore only issued half (300 grams) the daily POW ration.(16) The average ailments encountered by medical personnel included: weakness, diarrhea, edema, sore mouth, muscular wasting, rice belly, glossitis, hyporeflexia, and hypesthesia. The average POW weight loss was 45 pounds.(17)

After the critical medical treatment phase ended the organized program of rehabilitation began. The purpose of this program was to expedite complete recovery and return to duty of the maximum number of patients. When this goal was not feasible, the program made use of hospital time in preparing the patient for adjustment to civilian life.

Surgeon General VADM Ross T. McIntire ordered the establishment of an office of rehabilitation at the Bureau of Medicine and Surgery with purview over physical and occupational therapy, physical training, educational services, and civil readjustment.(18) Actual responsibility for implementation of such programs devolved to the individual hospital commanders and their designated rehabilitation officers. Programs varied in both content and quality from site to site. Patients were normally divided into two categories. The first group represented those whose return to active duty was anticipated while the second group consisted of men who would require long periods of hospitalization which normally resulted in discharge. All patients were generally provided with physical training and therapy as well as occupational therapy. Those returning to active service were sometimes given practical instructions in their Navy-related duties. Special programs had to be developed for the blind and deaf.(19)

Physical therapy was not new in naval hospitals, but the excessive number of orthopedic cases required wide expansion of programs and the procurement of special equipment for treatment. A continuous problem was the lack of trained physical therapists in the naval service. To help remedy this shortfall, special arrangements were made to offer commissions in the Women's Reserves to qualified graduates of approved institutions.(20) Additionally, members of the Hospital Corps were trained to help alleviate the manning problem in physical therapy.

Even though occupational therapy was utilized after World War I, the outbreak of the Second World War found the Navy without either a program in existence, or any occupational therapist on duty. Once again a limited number of therapists were commissioned via the Women's Re-

serves. While much of the treatment was left to the imagination of individual therapists, most programs included wood and metal work, printing, and handweaving. The purpose of the program was curative benefit for patients and not the production of articles. The rehabilitation activity also offered a wide range of educational services. Correspondence courses, self-training materials, classroom instruction, and visual aids provided instruction in everything from American history to Navy rate training and were well received by patients.(21)

Naval Hospital Philadelphia was designated as the center for rehabilitation of all cases of blindness in the Department of the Navy. The program was run by an ophthalmologist and was administered by specially chosen and trained corpsmen who provided individual attention to each patient. The blind sailors and marines came from all walks of life. They were all males and had levels of educational attainment that varied from college graduates to fourth grade dropouts. The blindness they suffered from was not just the result of battle wounds, but also accidental trauma, and ocular diseases. Patients were trained in the use of the typewriter, the study of Braille, and walking with a cane. In order to expedite social adjustment, they also attended sponsored social functions and went on shopping trips. The success of this program depended greatly on the skill, compassion, and dedication of the "orientors." As previously stated, these people were normally enlisted men whose job it was to orient the patients to where everything in the hospital was located. They assisted in all aspects of daily life from getting dressed and going to the head, to eventually traveling in the outside world. The best orientors allowed and encouraged their patients the freedom to teach themselves while keeping a watchful eye to render assistance as necessary. The display of either sentimentality or paternalism was to be strictly avoided. It was the decency and common sense of the orientors that helped to complete the healing process after medical science had reached its limit.(22)

Naval Hospital Philadelphia was also chosen as the site for rehabilitation of the deaf. With the help of state-of-the-art equipment and the advanced scientific procedures of Abbington Memorial Hospital's Dr. Walter Hughson, the Navy developed a well organized and effective program. The aural rehabilitation program was considered to be a pioneering undertaking. Its purpose was to enable patients to overcome psychological reactions to deafness and to supplement the patients residual hearing with mechanical and visual aids to the perception of sound. Extensive tests were run on each patient to accurately determine the nature and extent of the hearing loss. Each patient was provided with a hearing aid which was personally designed for him in the hospital laboratory from a cast of his external ear and auditory canal. Classes were given in lip reading and in the correction of speech impediments.(23) The advances made by this program made major contributions to the postwar study of audiology.

Rehabilitation for amputees was assigned to Naval Hospital Mare Island, CA, and the ubiquitous Naval Hospital Philadelphia. As most of the amputees required several surgical procedures, full advantage was taken of the intervals to implement educational and work trial programs both on board the command and in the local community. All artificial limbs were manufactured in the hospital facilities and many improvements in prosthesis resulted from this work. As with other rehabilitation programs, the amputee program was geared to prepare the patient for a successful reassimilation to civilian life. All patients were taught the operation of specially equipped automobiles and the states of California and Pennsylvania granted driver's permits to those who could meet their requirements.(24)

References

1. Stokesbury J. *A Short History of War World Two*, p 375.
2. Ibid., p 375.
3. Ibid., p 374.
4. Van der Vat D. *The Pacific Campaign*, p 392.
5. Cowdrey AE. *Fighting for Life*, p 317.
6. Ibid., p 318.
7. Ibid., p 319.
8. Ibid., p 320.
9. Ibid., p 321.
10. Bailey R. *Prisoners of War*, p 177
11. Ibid., p 183.
12. Ibid., p 183.
13. Ibid., p 192.
14. *History of the Medical Department of the United States Navy in World War II: A Narrative and Pictorial Volume*, p 367.
15. Ibid., p 369.
16. Ibid., p 371.
17. Ibid., p 371.
18. Ibid., p 360.
19. Ibid., p 358.
20. Ibid., p 359.
21. Ibid., p 360.
22. Cowdrey AE. *Fighting for Life*, p 328.
23. Ibid., p 363.
24. Ibid., p 364.

Bibliography

Bailey RH. *Prisoners of War*. Alexandria VA: Time-Life Books: 1981.

Cowdrey AE. *Fighting for Life*. New York: Free Press; 1994.

History of the Medical Department of the United States Navy in World War II: A Narrative and Pictorial Volume. Washington, DC: Government Printing Office; 1953.

Stokesbury JL. *A Short History of World War Two*. New York: William Morrow and Company; 1980.

Van der Vat D. *The Pacific Campaign*. New York: Simon and Schuster; 1991. ❑

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Recurrent Lobar Pneumonia in a Young Sailor: Carcinoid Tumor as a Part of the Differential Diagnosis

LCDR D.G. Dillard, MC, USNR
CAPT R.W. Foley, MC, USN
LCDR J. Grice, MC, USNR

The majority of respiratory tract infections in a healthy, active duty population resolve, as expected, with minimal sequelae. Pneumonia that either recurs or does not completely resolve should not be dismissed lightly as it may be caused by airway obstruction. Endobronchial carcinoid tumors present in young patients, usually with the classic triad of cough, hemoptysis, and recurrent infection. Despite being evaluated and treated on serial occasions for the same problem, it was not until his general medical officer obtained an adequate history that this patient was referred to a pulmonary medicine specialist that the diagnosis of carcinoid tumor was made.

Medical personnel should remember that their patients often move from assignment to assignment with no long-term care by a single health care provider. In like manner, the progressive rotation of providers to any specific command can result in a similar lack in continuity of care. Realizing that our system embodies this inherent but unavoidable problem requires that medical personnel rely on the patient's medical history as a subject of prime importance.

We present the case of a young sailor with recurrent lobar pneumonia on 10 occasions over a 4-year period who was found to have complete obstruction from a carcinoid tumor.

Case History

A 21-year-old white active duty serviceman presented to his ship's medical department with the complaint of pleuritic right chest and axillary pain of 5 days duration, associated with a nonproductive cough, and fever. The patient related 10 episodes of similar symptoms over the past 4 years. He had been treated for pneumonia on each of the previous episodes by other physicians at other commands. He denied weight loss, night sweats, hemoptysis, or other constitutional symptoms. He had smoked two packs of cigarettes daily for the past 7 years. A chest X-ray (Figure 1) showed a dense right upper lobe infiltrative process consistent with a consolidated pneumonia which, when compared to previous films taken over a period spanning 24 months, had apparently been unchanged.

The patient was referred to the Pulmonary Medicine Service at Naval Medical Center, Portsmouth, VA. A CAT scan of the chest showed a mass effect at the right upper lobe take-off with lobar collapse and areas of bronchiectasis. Bronchoscopy revealed complete obstruction of the right upper lobe bronchus and sample washings were suggestive of carcinoid.

At operation, the upper and middle lobes were found to be a fused, dense, and stony hard mass. The upper and middle lobes were resected en masse with the endobronchial portion of the tumor surrounded by a collar of the grossly normal bronchial margin under direct vision. Pathological examination revealed a 1.8-mm typical carcinoid completely obstructing the right upper lobe bronchus, organizing postobstructive pneumonia and five of five bronchial lymph nodes negative for tumor (Figure 2). The patient made an uneventful recovery.

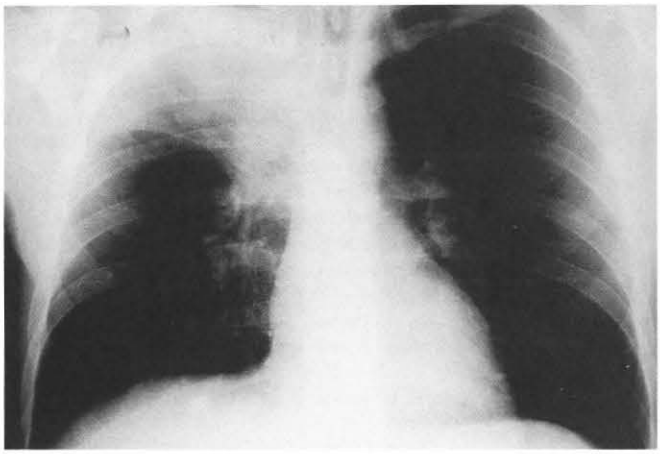

Figure 1

Figure 2

Discussion

The general medical officer is likely to diagnose and treat respiratory infections with the expectation that the patient will rapidly recover in a predictable manner. When the outcome is otherwise, it is necessary to consider the varying clinical patterns as seen in cases of slowly resolving, chronic, or recurrent pneumonia.

"Slowly resolving" pneumonia refers to prolonged persistence of the roentgenographic abnormality and is usually seen in elderly patients with associated chronic lung diseases and only rarely with obstructive lesions. "Chronic" pneumonia is defined as persistent symptoms and chest X-ray abnormalities for more than 1 month, frequently with progression. "Recurrent pneumonias" are two or more episodes of pulmonary infection separated by complete roentgenographic clearing of the previous infiltrate or an asymptomatic interval of at least a month; and as the total number of recurrences increases, the mean interval shortens. Recurrent pneumonias rarely effect healthy individuals as underlying illnesses are believed to be the causative agent.(1) Local bronchial obstruction leads to roentgenographic evidence of recurrence at the same site. Winterbauer showed that in patients with three or more pneumonias in the same lobe, half had localized intrathoracic disease such as bronchiectasis or airway obstruction.(1)

Carcinoid tumors occur in the appendix in approximately 40 percent of cases and are usually discovered incidentally at laparotomy or at autopsy. Other common sites are the rectum (14 percent), ileum (12 percent), and bronchus (12 percent).(2)

The vast majority of carcinoids are central (endobronchial) in location with three quarters presenting in the lobar bronchus and about 20 percent in the main stem bronchi. The remaining 5 to 10 percent present as peripheral tumors. This particular tumor represents 1 to 2 percent of all bronchial tumors.(3) Most patients are in their thirties and have symptoms for over 5 years when diagnosed.

The obstructive properties of the carcinoid tumor tend to be responsible for their presenting symptoms. The classic triad is cough, hemoptysis, and recurrent infection. The peripheral tumors are asymptomatic in most cases and are found as an incidental finding on chest X-ray. Endobronchial tumors produce obstructive findings (cough, recurrent infection) or hemoptysis (due to the vascularity of this tumor). Obstructive pneumonia, pain, fever, and dyspnea are signs of complete obstruction. Cough, wheezing, and recurrent distal infection with purulent sputum are indicators of a partially obstructive lesion.

Naidich reports that although bronchoscopy remains the mainstay of diagnosis, establishing the extent of disease has been difficult.(4) As the bulk of the tumor can be extraluminal, the bronchoscopist may only survey a portion of the actual mass. This phenomenon has led some authors to describe carcinoids as "iceberg tumors."

Resection is the only effective treatment for bronchial carcinoids. The histologic features of the tumor, its size, and the status of regional lymph nodes determine the prognosis which can only be determined at thoracotomy. If these factors are favorable, conservative conventional pulmonary resection techniques should offer adequate treatment.

Long-term prognosis for Stage I typical carcinoid tumors is above 90 percent at 10 years for all series reviewed. For atypical carcinoid tu-

mors, however, only 60 percent survive 10 years and with a large tumor or involvement of the regional lymph nodes the survival rate is considerably less.(3,5,6)

Conclusion

Our patient suffered from a disease state that was misdiagnosed by a succession of doctors who believed the problem to be a chronic illness rather than one of a more serious nature. A primary factor leading to the misdiagnoses was the limited time frame over which each doctor treated the patient. The eventual outcome was fortunate as the prognosis remains excellent, but this episode should serve to illustrate an important lesson-to-be-learned.

Our present system of medical care dictates that our active duty personnel will be seen by many health care providers. In such a setting, a careful evaluation of the medical history is of paramount importance when dealing with cases of recurrent disease.

In this specific instance, the medical history identified the common repetitive event as a pneumonia which always recurred in a specific anatomic location. Once that fact was established, application of the differential diagnosis for recurrent pneumonia yielded the specific etiology of the disease state.

References

1. Kirtland SH, Winterbauer RH. Slowly resolving, chronic, and recurrent pneumonia. *Clin Chest Med.* 12(2):303-318, 1991.
2. Galland RB, Blumgart LH. Carcinoid syndrome. Surgical management. *Brit J Hosp Med.* 167-170, 1986.
3. Rea F, et al. Bronchial carcinoids. A review of 60 patients. *Ann Thor Surg.* 47:412-414, 1989.
4. Naidich DP. CT/MR correlation in the evaluation of tracheobronchial neoplasia. *Rad Clin North Am.* 28:555-571, 1990.
5. Harpole DH, et al. Bronchial carcinoid tumors. A retrospective analysis of 126 patients. *Ann Thor Surg.* 54:50-55, 1992.
6. McCaughan BC, Martini N, Bains MS. Bronchial carcinoids. Review of 124 cases. *J Thorac Cardiovasc Surg.* 89:8-17, 1985. ❑

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In Memoriam

The 11th Director of the Navy Nurse Corps, CAPT **Veronica M. Bulshefski,** NC, died on 26 May 1995 in Alexandria, VA. She was 79.

CAPT Bulshefski, born in Ashley, PA, was a graduate of the Hospital School of Nursing, University of Pennsylvania and the School of Instruction in Occupational Therapy, Philadelphia, PA. She received her B.S. degree in nursing from Indiana University and her M.S.degree in administration from the Navy Post Graduate School, Monterey, CA.

CAPT Bulshefski was commissioned in the Nurse Corps on 8 Jan 1940 and reported to Naval Hospital, Brooklyn, NY, for duty. Promotions followed in the grade of lieutenant (junior grade) in March 1943, lieutenant in April 1946, lieutenant commander in January 1952, and commander in October 1958. She was selected to captain in September 1965 and was appointed to that rank when

she was sworn in as director of the Nurse Corps.

Her military career included assignments at Naval Hospital, Pearl Harbor during World War II; Nurse Corps detailer, Bureau of Medicine and Surgery, Washington, DC; and occupational therapy instructor at the Naval Medical School, Bethesda, MD. She served as chief of nursing service at Naval Hospitals Beaufort, SC; Guam; Jacksonville, FL; Pensacola, FL; and Oakland, CA.

While serving as chief nurse at Naval Hospital, Oakland, CAPT Bulshefski was selected to succeed CAPT Ruth A. Erickson as director of the Navy Nurse Corps. She was appointed on 1 May 1966. Under her directorship the Nurse Corps progressed to an unprecedented state of readiness, and Nurse Corps requirements and billets were restructured to meet the current needs of nursing practice. CAPT Bulshefski retired on 1 May 1970. During her naval service she was awarded the Legion of Merit, the Asiatic Pacific Campaign Medal, the World War II Medal, and the American Theater Medal.

During her retirement years, CAPT Bulshefski was instrumental in founding and supporting the Good Shepherd Stroke Support Group.

Education and Training Restructuring

To meet the OPNAV mandate for headquarters reductions, a three phase plan to restructure Navy Medical Department Education and Training will be implemented over the next 7 years.

Phase one, to be completed by 30 Sept 1995, provides for reduction of Bureau of Medicine and Surgery (BUMED) headquarters billets and infrastructure by disestablishing the Naval Health Sciences Education and Training Command (HSETC), Bethesda, MD; relocation of education and training policy functions to BUMED; strengthening operational/readiness training by centralizing management of this training under MED-05; realigning the HSETC executive functions to the Naval School of Health Sciences (NSHS), Bethesda, MD; and consolidation of technical training at fleet concentration areas in Portsmouth, VA, and San Diego, CA, by realigning NSHS Bethesda detachments under these commands.

Phase two, which will proceed through December 1997, will continue infrastructure reduction with expansion of technical training at NSHS Portsmouth, VA, and development of plans to establish a naval school of operational medicine.

Phase three, to be completed by December 2002, will complete the consolidation of technical training at NSHS Portsmouth, VA, and NSHS building 141 at National Naval Medical Center, Bethesda, MD, will be vacated and a school of operational medicine will be established.

The Surgeon General approved this three phase plan in February 1995.

Phase one is moving quickly with plans to disestablish HSETC, upgrade the NSHS Bethesda detachment at Portsmouth to an NSHS, realign the four remaining detachments under NSHS San Diego and Portsmouth, consolidate technical training at NSHS Portsmouth and San Diego, and develop a timeline for vacating building 141 at Bethesda. With the disestablishment of HSETC on 30 Sept 1995, the headquarters functions, 40 supporting billets and personnel, will be assigned to BUMED-05, Assistant Chief for Education, Training and Personnel. The remaining functions of HSETC will be realigned under NSHS Bethesda.

The mission of the Assistant Chief for Education, Training and Personnel will be to direct the education, training, and development of Medical Department personnel to meet their peacetime and wartime role requirements. Specific functions for which MED-05 will have responsibility include: establish education and training policy, plans, standards, assessment, control, and direction for members of the Medical Department; provide program management for all education and training resources; provide policy and direction for graduate education, clinical investigation, visual information, program evaluation, needs determination, and resource sponsorship; provide central management of all medically related operational/readiness training; liaison with other DOD agencies for education and training issues; support joint education and training initiatives; and coordinate research and development of teaching and training systems and concepts. New divisions will be established in MED-05 for Education and Training Standards (MED-53) and Education and Training Operations (MED-54).

Phase Two of the restructuring will continue through December 1997. A plan will be developed to establish a naval school of operational readiness, consolidating management of all medically related operational/readiness training for all corps and all platforms. This plan will be coordinated with the ongoing initiatives to develop the Operational Medicine Institute. The consolidation of technical training will continue at NSHS Portsmouth and be completed at NSHS San Diego. Using the Health Services Analysis Process, all education and training commands will be reviewed to determine if further restructuring or incorporation into larger command elements would result in greater efficiency or reduction of infrastructure.

Phase Three, the final phase of the restructuring, will be completed by December 2002. This includes establishing the Naval School of Operational Medicine, construction of a new schoolhouse at NSHS Portsmouth, final consolidation of technical training in the Tidewater area, and vacating building 141, which currently houses NSHS Bethesda.

When completed, the restructuring to include disestablishing HSETC, streamlining headquarters functions under the Assistant Chief for Education, Training and Personnel, consolidating technical training, and standing-up of a centrally managed school for all operational/readiness training, will have answered today's mandate for change. The Medical Department will have reduced overall headquarters billets, implemented the CNO recommendation for resource sponsorship of education and training under a BUMED Assistant Chief, and standardized education and training policy throughout Navy medicine. Consolidated technical training will allow state-of-the-art technology and improved quality of life for our students. Fragmented management of operational/readiness training will be eliminated, and our readiness posture strengthened and more responsive. Navy medicine will achieve its strategic goals in our plan, "Training for Excellence."

Naval Medical Research and Development Command Highlights

• Two Navy Inventors Receive First Royalty Payments for Licensing of Patent Rights

RADM F. Sanford, MC, Assistant Chief, Operational Medicine and Fleet Support, presented checks to coinventors Thomas Davis, Ph.D., and Kelvin Lee, M.D., of the Stem Cell Biology Branch, Immune Cell Biology Program at the Naval Medical Research Institute, Bethesda, MD. The two researchers received royalty payments for the licensing rights of their inventions. This exclusive license agreement resulted from research supported by a Cooperative Research and Development Agreement (CRADA) between the Navy and Cellco Inc., Germantown, MD. This is the first such license granted by a CRADA mechanism in the entire Navy. This CRADA was established in 1993 for the purpose of developing a deployable stem cell culture system. Dr. Davis and Dr. Lee are involved in Navy efforts that focus on culturing bone marrow stem cells outside the body for the treatment of casualties caused by acute bone marrow injury. These inventors contributed to the development of a unique *in vitro* culture system that mimics the bone marrow microenvironment. Bone marrow stem cells give rise to all the mature elements in the blood such as red blood cells, neutrophils, monocytes, lymphocytes, and platelets. The system is currently undergoing qualification for clinical use and is not yet commercially available. The Federal Technology Transfer Act (FTTA) allows the government to license government patents for royalties. The FTTA and SECNAVINST 5870.20D require that a percentage of the royalties are shared with the inventors. The remaining royalties are provided to the inventor's laboratory.

• Impact of Infectious Diseases on U.S. Troops During Operations Desert Shield/Desert Storm

Navy infectious disease researchers, in collaboration with Navy preventive medicine officers, published an assessment of the impact of infectious diseases on U.S. troops deployed to the Persian Gulf during 1990 and 1991 in *Clinical Infectious Diseases,* June 1995. The incidence of nonbattle injuries, including infectious diseases morbidity, was lower than any previous war involving U.S. military personnel. Infectious diseases were not a major cause of lost manpower, unlike the experience of Western troops in the Persian Gulf during WWII. This can be attributed to a combination of factors including the presence of a comprehensive medical care infrastructure which was capable of controlling many infectious disease problems like acute diarrhea, and the extensive preventive medicine effort by the U.S. military, which include continuous disease surveillance and rapid diagnostic support to quickly identify and correct health hazards. The primary cause of infectious disease morbidity among the 697,000 troops was mild diarrheal and respiratory disease. The most unexpected medical outcome of the deployment was the very low risk of arthropod-borne infections. The reason was probably due to the deployment of troops to the open desert during the cooler winter months, which provided the least favorable conditions for arthropod-transmitted diseases like sandfly fever and leishmaniasis. It is critical for the Navy to maintain an infectious diseases research program to develop new vaccines and more accurate and rapid diagnostic tests to improve medical treatments.

•On the Internet

The Naval Medical Research and Development Command (NMRDC) is posting items of interest on a gopher-based information system on the internet. Pending some network and other computer system upgrades, the menu is being hosted on the Defense Modeling and Simulation Office's Modeling and Simulation Information System. Gopher-users can telnet to the system's main menu at msis.dmso.mil. Once connected, select the 'Organizations and Groups' menu item and then 'NMRDC' menu item. For individuals with access to Mosaic, or some other Web browser, connect to the system's home page at http://www.dmso.mil. From the home page, go to the NMRDC menu by selecting 'MSIS', then 'Organizations and Groups' and then 'NMRDC'.

For more information on these and other research efforts by the Naval Medical Research and Development Command, contact CAPT T.J. Singer, MSC, Director, External Relations, at DSN 295-6182, Commercial 301-295-6182, FAX 301-295-4033, or E-mail RDC03@NMRDC1.NMRDC.NNMC.NAVY.MIL.

Navy Medicine 1905

Carl Pruett Collection

PhM3c Clyde Camerer sports his new uniform.

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